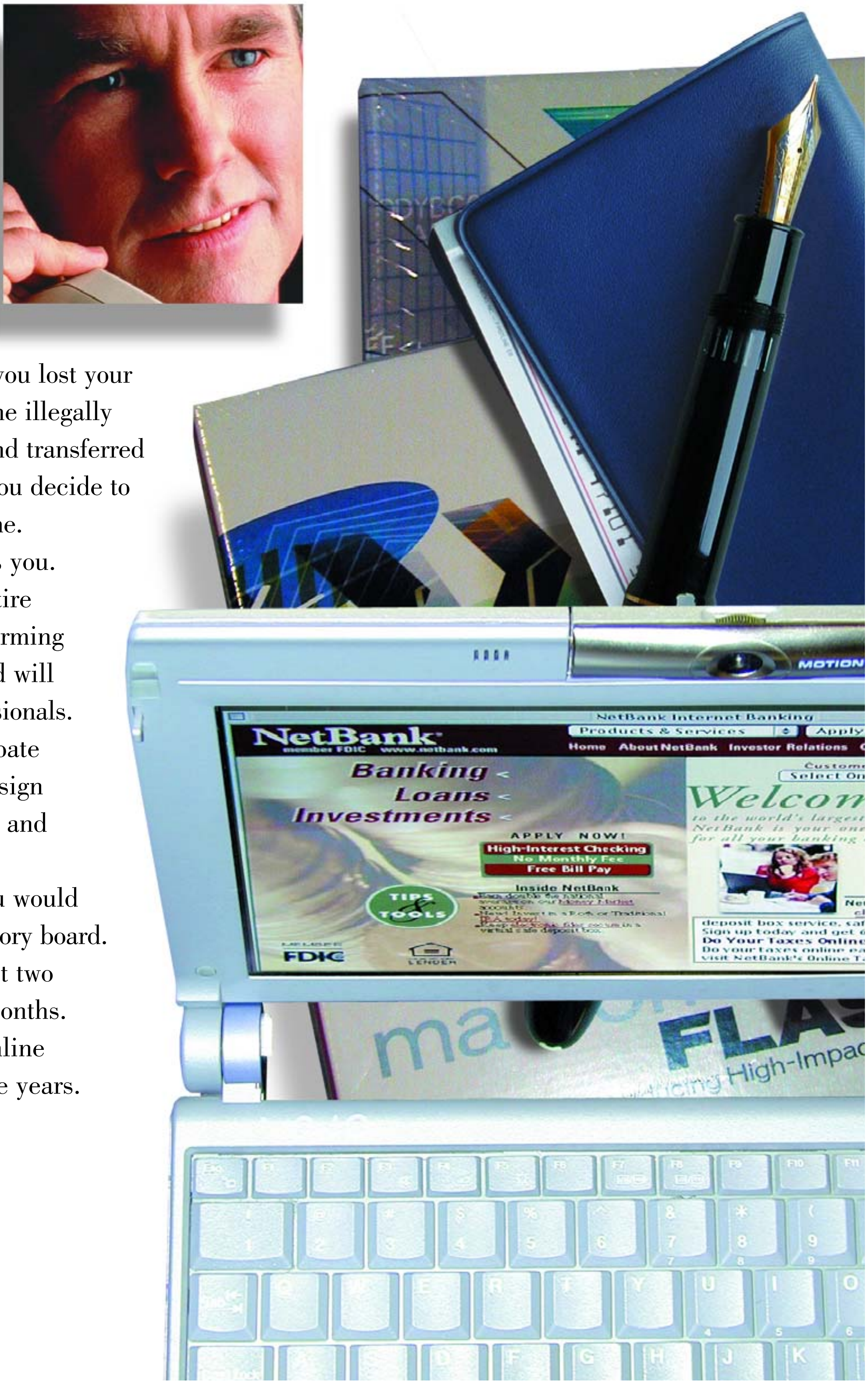
CHAPTER 14

Information Systems Development



It never fails. The telephone rings just as you sit down to dinner. Tonight, you decide to let the answering machine take the call. As you eat your salad, the caller begins to leave her message. She identifies herself as the vice president where you do your banking. You panic. Did you forget to deposit your last paycheck? Have you lost your checkbook or ATM card? Has someone illegally accessed your online bank account and transferred money from your account to theirs? You decide to take the call. Dinner can wait this time.

Her reason for calling amazes you. The bank is going to re-design its entire Web site. For this project, they are forming a customer advisory board. The board will work with the bank's computer professionals. Advisory board members will participate in all aspects of the project: make design suggestions, review work in progress, and test the new Web site.

The vice president asks if you would be willing to be on the customer advisory board. It will require your attention for about two hours per week during the next six months. As a thank you for your time, your online banking will be free for the next three years. Are you interested?

OBJECTIVES

After completing this chapter, you will be able to:

- Explain the phases in the system development life cycle
- Identify the guidelines for system development
- Recognize the responsibilities of various IT professionals
- Discuss the importance of project management, feasibility assessment, data and information gathering techniques, and documentation
- Describe how structured tools such as entity-relationship diagrams and data flow diagrams are used in analysis and design
- Differentiate between packaged software and custom software
- Identify program development as part of the system development life cycle
- Discuss techniques used to convert to a new system
- Understand how IT professionals support an information system

Web Link

For more information on software engineering, visit the Discovering Computers 2002 Chapter 14 WEB LINK page (**scsite.com/dc2002/ch14/weblink.htm**) and click Software Engineering.

WHAT IS THE SYSTEM DEVELOPMENT LIFE CYCLE?

A **system** is a set of components that interact to achieve a common goal. Your body, for example, contains many systems. The digestive system consists of organs that allow your body to process food. The immune system includes the elements that protect your body from disease. The respiratory system has many parts that work together, so you can breathe.

You use, observe, and interact with systems during daily activities. You drive a highway system to reach a destination. Your home maintains a comfortable temperature with its heating and cooling systems. You use the decimal number system to calculate an amount due. You watch the stars in the solar system.

Businesses also use many types of systems. A billing system allows a company to send invoices and receive payments from customers. Through a payroll system, employees receive paychecks. A manufacturing system produces the goods that customers order. The inventory system keeps track of the items in the warehouse. Very often, these systems also are information systems.

An **information system** (**IS**) is a set of hardware, software, data, people, and procedures that work together to produce information. You play an important role in many information systems. You provide information to some information systems. For example, many sytems display forms that ask you to enter personal information such as your name, address, telephone number, and interests. With other information systems, you use their information. When you receive a deposit slip from the bank, you verify the deposit amount is correct.

An information system supports daily, short-term, and long-range activities of users. Users include clerks, sales representatives, accountants, supervisors, managers, executives, and customers. As time passes, the kinds and types of information that users need often change. A sales manager may want the weekly summary report grouped by district instead of by product. When information requirements change, the information system must meet the new requirements. In some cases, the developers modify the current information system. In other cases, they develop an entirely new information system.

As a computer user in a business, you someday may participate in the modification of an existing system or the development of a new system. Thus, it is important you understand the development process. The **system development life cycle** (**SDLC**) is a set of activities developers use to build an information system. System developers should use an SDLC to guide them through system development. They also should use an SDLC to maintain and monitor ongoing activities.

Some IT professionals refer to the entire system development process as **software engineering**. The meaning of this term varies. For example, it can describe the programming process.

Some activities in the SDLC may be performed concurrently. Others are performed sequentially. Depending on the type and complexity of the information system, the length of each activity varies from one system to the next. In some cases, a developer skips an activity entirely.

Phases in the SDLC

To help organize the process, SDLCs often group many activities into larger categories called **phases**. Most SDLCs contain five phases:

1. Planning
2. Analysis
3. Design
4. Implementation
5. Support

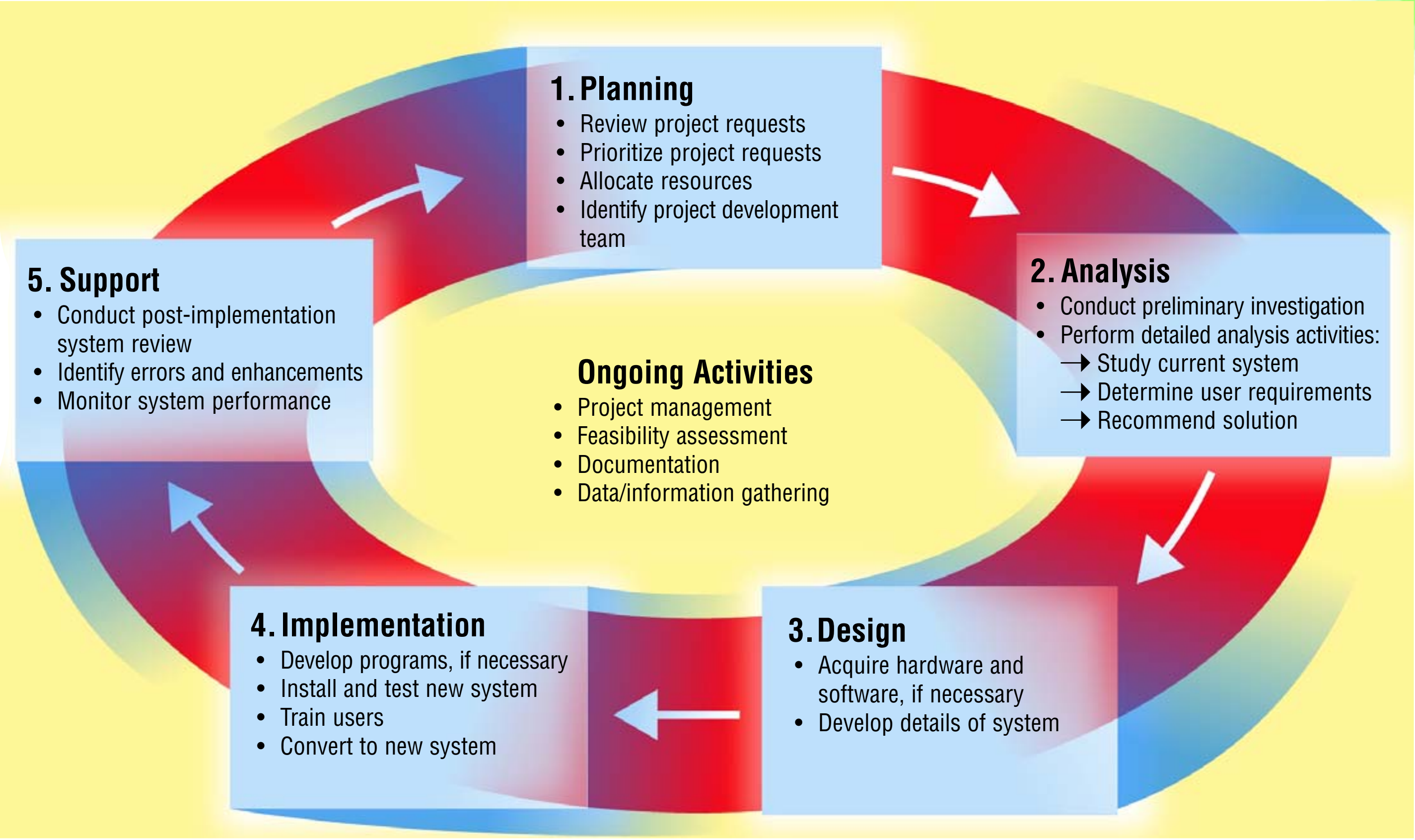

1. Planning
• Review project requests
• Prioritize project requests
• Allocate resources
• Identify project development team
2. Analysis
• Conduct preliminary investigation
• Perform detailed analysis activities:
→ Study current system
→ Determine user requirements
→ Recommend solution
3. Design
• Acquire hardware and software, if necessary
• Develop details of system
4. Implementation
• Develop programs, if necessary
• Install and test new system
• Train users
• Convert to new system
5. Support
• Conduct post-implementation system review
• Identify errors and enhancements
• Monitor system performance
Ongoing Activities
• Project management
• Feasibility assessment
• Documentation
• Data/information gathering

Figure 14-1 The system development life cycle consists of five phases that form a loop. Several ongoing activities also take place throughout the entire system development life cycle.

As shown in Figure 14-1, the phases in the SDLC form a loop. That is, information system development is an ongoing process. The cycle forms when the support phase points to the planning phase, thus creating a loop. This connection occurs when the information system requires changing. A variety of situations can lead to a change in the information system. A report might generate an incorrect total. Users may want information in a different format. A vendor may release a new version of software. Hardware might become obsolete. When change occurs, the planning phase for a new or modified system begins and the SDLC process starts again.

Developers follow established guidelines during the entire SDLC process. These developers also interact with a variety of IT professionals and others during the SDLC. Although the SDLC contains a set of five phases, several ongoing activities take place during the entire process. The following sections discuss each of these issues.

Guidelines for System Development

The development of an information system should follow three general guidelines: (1) use phases, (2) involve the users, and (3) develop standards.

First, the SDLC should group activities or tasks into phases. Many SDLCs contain the five major phases that are shown in Figure 14-1. Others have more or fewer phases. Regardless, all SDLCs have similar activities and tasks. Figure 14-1 shows the Develop Programs activity as part of the Implementation phase. Some SDLCs add a sixth phase called Construction or Development, which includes the Develop Programs activity. Other differences among SDLCs are the terminology they use, the order of their activities, and the level of detail within each phase.

Second, system developers must involve users throughout the entire system development process. **Users** include anyone for whom the system is being built. Customers, data entry clerks, accountants, sales managers, and owners are all examples of users. You are a user of many information systems. You, as a user, might interact with an information system at your bank, library, grocery store, video rental store, work, and school. System developers must remember they ultimately deliver the system to the user. If the system is to be successful, the user must be included in all stages of development. Users are more apt to accept a new system if they contribute to its design.

Third, the development process should have standards clearly defined. **Standards** are sets of rules and procedures a company expects employees to accept and follow. Having standards helps people working on the same project produce consistent results. For example, one developer might refer to a product number in a database as a Product ID. Others may call it a product identification number, product code, and so on. A system created in this way would be so confusing that it could never function correctly! If the SDLC defines standards, then everyone involved uses one term, such as product number.

Who Participates in the System Development Life Cycle?

The development of an information system should involve representatives from each department in which the proposed system will be used. This includes both nontechnical users and IT professionals. During the course of the SDLC, the systems

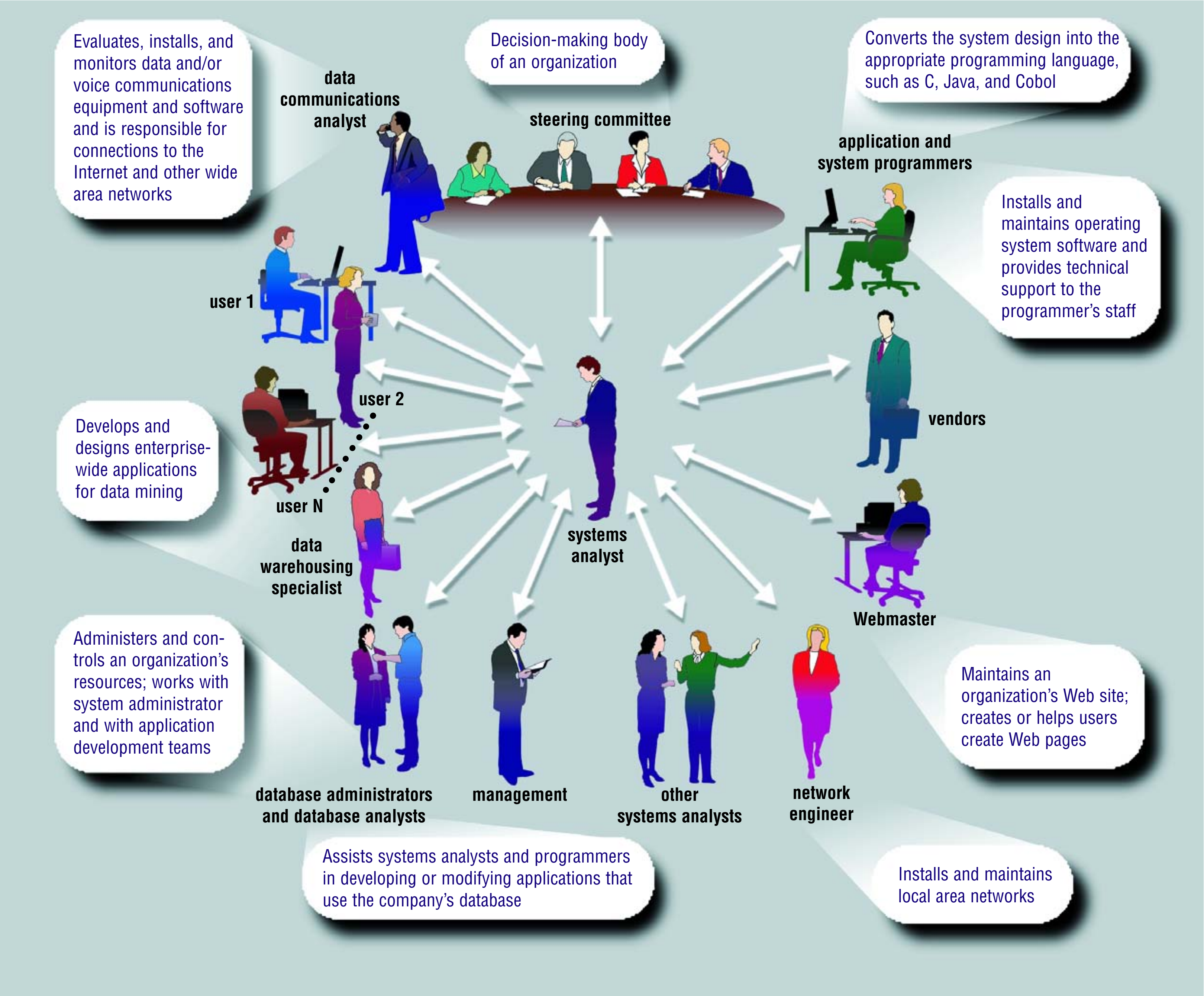

Evaluates, installs, and monitors data and/or voice communications equipment and software and is responsible for connections to the Internet and other wide area networks
data communications analyst
Decision-making body of an organization
steering committee
Converts the system design into the appropriate programming language, such as C, Java, and Cobol
application and system programmers
Installs and maintains operating system software and provides technical support to the programmer's staff
user 1
user 2
user N
vendors
Develops and designs enterprise-wide applications for data mining
data warehousing specialist
systems analyst
Webmaster
Administers and controls an organization's resources; works with system administrator and with application development teams
Maintains an organization's Web site; creates or helps users create Web pages
database administrators and database analysts
management
other systems analysts
network engineer
Assists systems analysts and programmers in developing or modifying applications that use the company's database
Installs and maintains local area networks

Figure 14-2 A systems analyst meets with a variety of people during a system development project.

analyst meets and works with a variety of people (Figure 14-2). The systems analyst is the users' primary contact person. A **systems analyst** is responsible for designing and developing an information system.

A systems analyst is the liaison between the users and the IT professionals. They convert user requests into technical specifications. Thus, a systems analyst must have some technical skills. They also must be familiar with business operations and have excellent communication and interpersonal skills. Systems analysts prepare many reports, drawings, and diagrams. They discuss various aspects of the development project with users, management, other analysts, database analysts, database administrators, network administrators, the Webmaster, programmers, vendors, and the steering committee. The **steering committee** is a decision-making body in a company.

For each system development project, a company usually forms a **project team** to work on the project from beginning to end. The project team consists of users, the systems analyst, and other IT professionals. One member of the team is the **project leader**, who manages and controls the budget and schedule of the project. The systems analyst may or may not be selected as the project leader of the project.

Project Management

Project management is the process of planning, scheduling, and then controlling the activities during the SDLC. The goal of project management is to deliver an acceptable system to the user in an agreed-upon time frame, while maintaining costs.

To plan and schedule a project effectively, the project leader identifies the following for the project:

- Goal, objectives, and expectations of the project, called the **scope**
- Required activities
- Time estimates for each activity
- Cost estimates for each activity
- Order of activities
- Activities that can take place at the same time

Once identified, the project leader usually records these items in a **project plan**. A popular tool used to plan and schedule the time relationships among project activities is called a Gantt chart (Figure 14-3). A **Gantt chart**, developed by Henry L. Gantt, is a bar chart that uses horizontal bars to show project phases or activities. The left side, or vertical axis, displays the list of required activities. A horizontal axis across the top or bottom of the chart represents time.

Time estimates assigned to activities should be realistic. If they are not realistic, the success of a project is in jeopardy from the beginning. When project members do not believe a schedule is reasonable, they may not participate to the full extent of their abilities. This could lead to missed deadlines and delivery dates.

Once a project begins, the project leader monitors and controls the project. Some activities will take less time than originally planned. Others will take longer. The project leader may realize that excessive time has been devoted to a particular activity. Thus, the team will not be able to meet the original deadline of the project. In these cases, the project leader may extend the deadline or may reduce the scope of the system development. If the latter occurs, the users will receive a less comprehensive system at the original deadline. In either case, the project leader revises the first project plan and presents the new plan to users for approval. It is crucial that everyone is aware of and agrees on any changes made to the project plan.

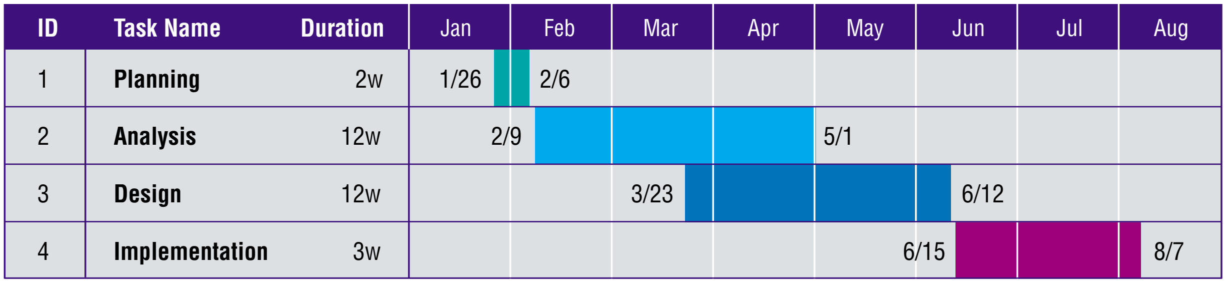
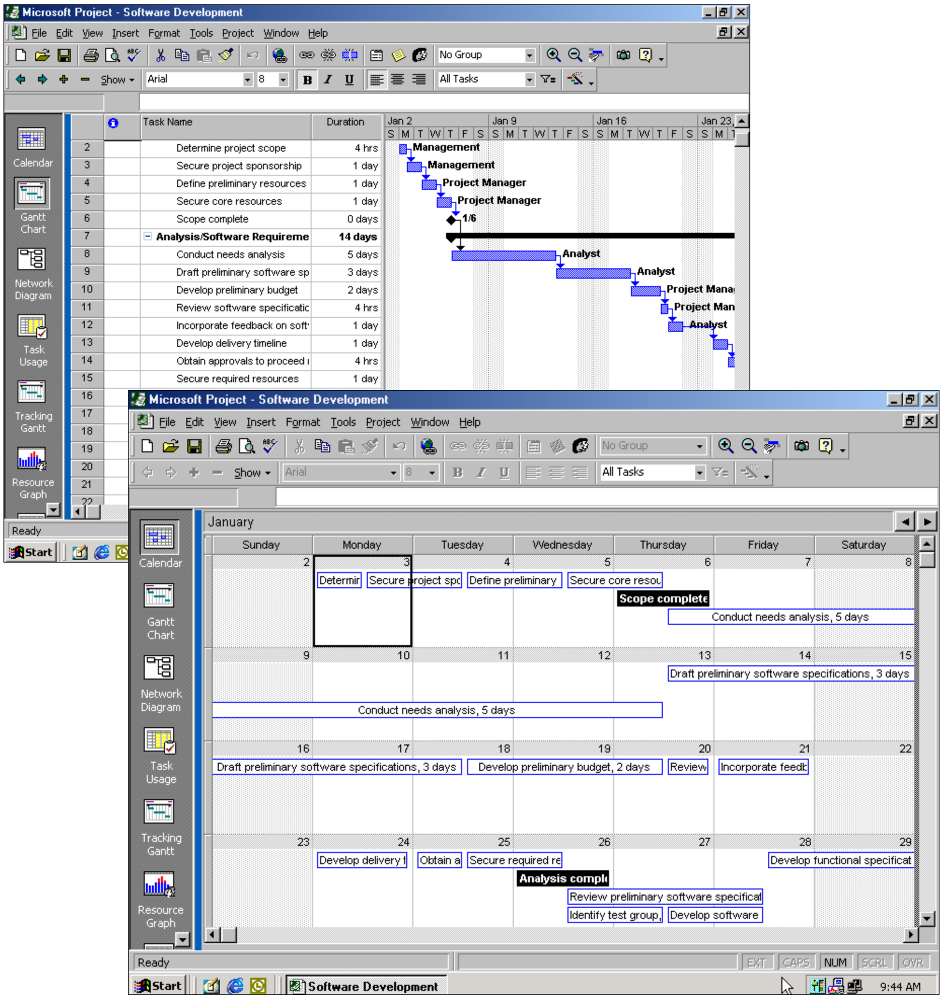


Figure 14-3 A Gantt chart is an effective way to show the time relationships of a project's activities.

One aspect of managing projects is making sure everyone submits deliverables on time and according to plan. A **deliverable** is any tangible item such as a chart, diagram, report, or program file. Project leaders can use **project management software** such as Microsoft Project, to assist them in planning, scheduling, and controlling development projects (Figure 14-4).

Figure 14-4a (Gantt chart)



Microsoft Project - Software Development

	Task Name	Duration
2	Determine project scope	4 hrs
3	Secure project sponsorship	1 day
4	Define preliminary resources	1 day
5	Secure core resources	1 day
6	Scope complete	0 days
7	**Analysis/Software Requireme**	**14 days**
8	Conduct needs analysis	5 days
9	Draft preliminary software sp	3 days
10	Develop preliminary budget	2 days
11	Review software specificatic	4 hrs
12	Incorporate feedback on soft	1 day
13	Develop delivery timeline	1 day
14	Obtain approvals to proceed	4 hrs
15	Secure required resources	1 day

Figure 14-4b (calendar of activities)

Figure 14-4 Microsoft Project is a popular project management software package. Shown here is a Gantt chart and calendar for a software development project.

Feasibility Assessment

Feasibility is a measure of how suitable the development of a system will be to the company. A project that is feasible at one point of the SDLC might become infeasible at a later point. Thus, systems analysts frequently re-evaluate feasibility during the SDLC.

A systems analyst typically uses four tests to evaluate feasibility of a project: operational feasibility, schedule feasibility, technical feasibility, and economic feasibility.

Operational feasibility measures how well the proposed information system will work. Will the users like the new system? Will they use it? Will it meet their requirements? Will it cause any changes to their work environment?

Schedule feasibility measures whether the established deadlines for the project are reasonable. If a deadline is not reasonable, the project leader might make a new schedule. If a deadline cannot be extended, then the scope of the project might be reduced to meet the mandatory deadline.

APPLY IT!

Project Management for Your Personal Life

Project management software is not limited to workplace situations. You can use this software to manage projects within your personal life as well. Consider some of these examples: planning a fund-raising project, building a new home, or preparing for a party or wedding. Any project that requires planning and coordination and is dynamic in nature can benefit from this application.

Suppose you are planning a wedding or one of the other above examples. To begin this process and build your project plan, you first determine baseline tasks.

1. Set specific dates for all tasks
2. Define roles and responsibilities
3. Enter all data into your project management program
4. Generate a Gantt chart to show the time relationships of your project
5. Continue to monitor your project and manage your tasks
6. Add unscheduled events
7. Track your budget and schedule
8. Re-plan as necessary
9. Communicate with team members
10. Share any changes with all involved project members

Microsoft Project is the most widely used project management software. Several shareware project management programs also are available or you can use Excel to create a Gantt chart.

For links to shareware programs and other helpful links, visit the Discovering Computers 2002 Apply It Web page (**scsite.com/dc2002/apply.htm**) and click Chapter 14 Apply It #1.

Technical feasibility measures whether the company has or can obtain the hardware, software, and people needed to deliver and then support the proposed information system. For most system projects, the technology exists. Hardware, software, and people typically are available to support an information system. The challenge is obtaining funds to pay for these resources. Economic feasibility addresses funding.

Economic feasibility, also called **cost/benefit feasibility**, measures whether the lifetime benefits of the proposed information system will be greater than its lifetime costs. A systems analyst uses many financial techniques, such as return on investment and payback analysis, to perform the cost/benefit analysis. If systems analysts are not familiar with these financial techniques, they can ask for assistance from a financial analyst.

Documentation

During the entire SDLC, project team members produce much documentation. **Documentation** is the collection and summarization of data and information. It includes reports, diagrams, programs, or any other deliverable generated during the SDLC.

A **project notebook** contains all documentation for a single project. The project notebook might be a simple three-ring binder. Many companies, however, have analysis and design software packages that allow you to create an automated project notebook.

Users and IT professionals refer to existing documentation when working with and modifying existing systems. It is important that all documentation is well written, thorough, and understandable. Documentation should be an ongoing part of the SDLC. Too often, project team members put off documentation because it is time consuming. They mistakenly regard it as an unimportant or unproductive part of the SDLC.

Data and Information Gathering Techniques

Throughout the SDLC, members of the project team gather data and information. They need accurate and timely data and information for many reasons. They must keep a project on schedule, evaluate feasibility, and be sure the system meets requirements. Systems analysts and other IT professionals use several techniques to gather data and information. They review documentation, observe, send questionnaires, interview, conduct joint-application design sessions, and research. The following paragraphs discuss these techniques.

- **Review documentation** – By reviewing documentation such as a company's organization chart, memos, and meeting minutes, you can learn the history of a project. Documentation also provides information about the company such as its operations, weaknesses, and strengths.
- **Observe** – Observing people helps you understand exactly how they perform a task. Likewise, observing a machine allows you to see how it works.
- **Questionnaire** – To obtain data and information from a large number of people, you could send a questionnaire.
- **Interview** – The interview is the most important data and information gathering technique. It allows you to clarify responses and probe for feedback face to face.

Web Link

For more information on project management software, visit the Discovering Computers 2002 Chapter 14 WEB LINK page (**scsite.com/dc2002/ch14/weblink.htm**) and click Project Management Software.

ISSUE

Above and Beyond

Human Behavior While Being Observed

During the data and information gathering stage of the SLDC, employees are involved actively in the process. They complete questionnaires, participate in interviews, and are observed while performing their jobs. Many researchers suggest that during this process the employees may not exhibit everyday behavior and may perform above and beyond their normal workday activities. They base this premise on the Hawthorne Effect, the result of a study performed in the 1930s in Hawthorne, Illinois, in which it was discovered that the act of merely observing individual behavior could impact one's behavior. What is your opinion of the Hawthorne Effect? Do you agree with the research? If someone is observing you at work or you were receiving more attention than normally, would this influence you to alter your behavior? Why or why not?

For more information on the Hawthorne Effect, visit the Discovering Computers 2002 Issues Web page (**scsite.com/dc2002/issues.htm**) and click Chapter 14 Issue #1.

Web Link

For more information on JAD sessions, visit the Discovering Computers 2002 Chapter 14 WEB LINK page (**scsite.com/dc2002/ch14/weblink.htm**) and click JAD Sessions.

- **JAD session** – An alternative to the one-on-one interview is a joint-application design session. A **joint-application design (JAD) session** is a lengthy, structured, group work meeting where users and IT professionals discuss an aspect of the project (Figure 14-5). The goal of a JAD session is to obtain group agreement on an issue. For example, the participants may try to identify problems associated with an existing system.
- **Research** – Newspapers, computer magazines, reference books, and the Web are excellent sources of information (Figure 14-6). These sources can provide you with information such as the latest hardware and software products and explanations of new processes and procedures.

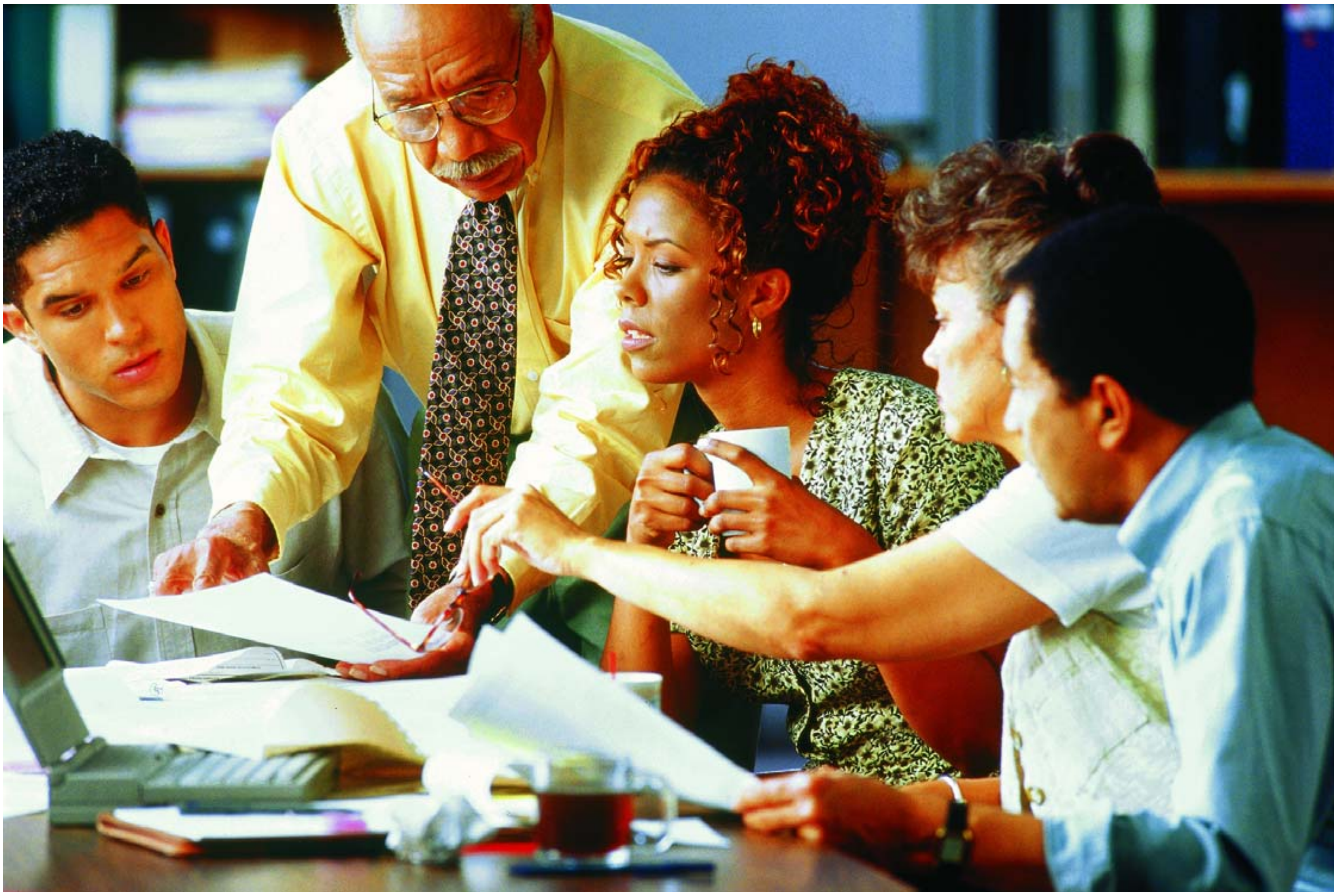


Figure 14-5 During a JAD session, the systems analyst is the moderator, or leader, of the discussion. Another member, called the scribe, records facts and action items assigned during the session.

Figure 14-6a (reference book)

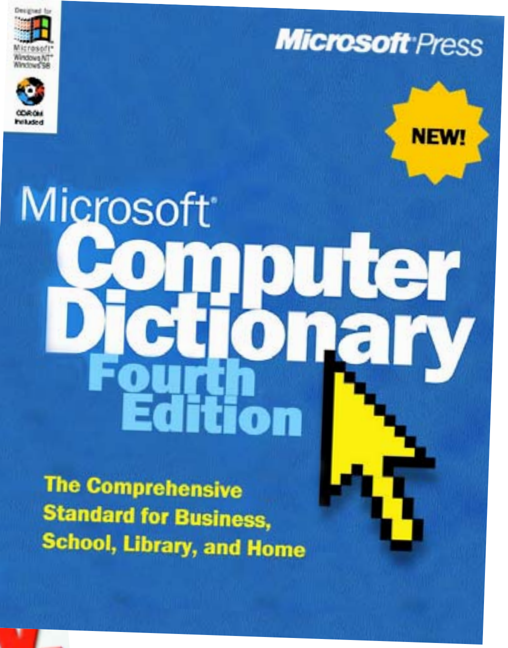

Microsoft Press
NEW!
Microsoft Computer Dictionary
Fourth Edition
The Comprehensive Standard for Business, School, Library, and Home

Figure 14-6b (computer magazine)

PC MAGAZINE
www.pcmag.com
SPECIAL ISSU
PC Labs Tests • Notebooks • Smart Phones • PDAs • Servi
CONNEC EVERY-WHERE
FIRST LOOKS GET WEB INFORMATION FROM ANY PHONE
AFTER HOURS TRAVEL SITES GET YOU THE BEST DEALS
INTERNET BUSINESS THE NEW WEB WORLD OF RETAIL
PC INTERNET

Monday, October 9

Cisco Agrees To Buy Vovida Networks, IPCell

Acquires Vovida Networks, IPCell in $369M purchases.

Expanding The Internet Beyond .com

News: Afilias bids for rights to .info, .site, and .web TLD strings.

October 06 in Web Design & Development

Olympics Win Over Web Audience

News: The Olympics might have given a less than stellar performance in TV ratings, but they won over the crowd on the Web, according to numbers from

Opinion: .Net Is A Many-Layered Promise

Microsoft's .Net may confuse many people, Johnston says.

Roundtable: Ensuring Secure User Management

Figure 14-6c (Web site)

Figure 14-6 Reference books, computer magazines, and the Web are resources that can provide the systems analyst with a variety of valuable information.

COMPANY ON THE CUTTING EDGE

ZIFF DAVIS MEDIA™

Tech Magazines Publisher

Shopping for a new computer? Looking for winning strategies for your video games? Wanting to start an innovative e-commerce site? Chances are one of the publications produced by Ziff Davis Media is just what you need.

Ziff Davis is the leading information authority for buying, using, and experiencing technology and the Internet. It is the largest technology and Internet magazine publisher and the sixth largest magazine publisher in the United States. The company also is at the forefront in creating a new generation of consumer and business media that educate, entertain, and empower people.

In the United States, Ziff Davis Media publishes industry-leading consumer and business publications: *PC Magazine, Ziff Davis SMART BUSINESS for the New Economy, Yahoo! Internet Life, Family PC, Expedia Travels, Electronic Gaming Monthly, Official U.S. PlayStation Magazine, Computer Gaming World, Expert Gamer, eWEEK, Inter@ctive Week, Sm@rt Partner,* and *The Net Economy*. Through a joint venture with International Data Group, the company also publishes *Macworld.*

For more information on Ziff Davis Media, visit the Discovering Computers 2002 Companies Web page (**scsite.com/dc2002/companies.htm**) and click Ziff Davis.

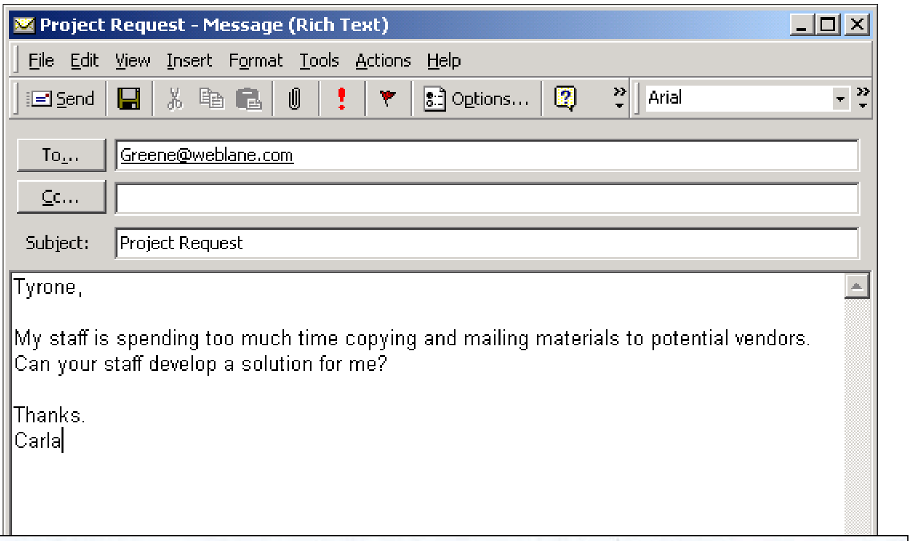
WHAT INITIATES THE SYSTEM DEVELOPMENT LIFE CYCLE?

A user may request a new or modified information system for a variety of reasons. The most obvious reason is to correct a problem. The total salaries on a report may be incorrect. Another reason is to improve the information system. For example, if a school wants to allow students to register for classes online, it would have to modify the existing registration system to include this new feature.

Sometimes situations outside your control cause you to modify an information system. Corporate management or some other governing body may mandate a change. For example, a nationwide insurance company might require all offices to use the same calendar software. Competition also can lead to change. Once one grocery store offers online shopping, others will follow for fear of losing customers.

A user may request a new or modified information system verbally in a telephone conversation or written as an e-mail message (Figure 14-7a). In larger companies, users write a formal request for a new or modified information system, which is called a **request for system services** or **project request** (Figure 14-7b). This document becomes the first item in the project notebook. It also triggers the first phase of the SDLC: planning.

Figure 14-7a (informal project request)


Project Request - Message (Rich Text)
File Edit View Insert Format Tools Actions Help
Send
Options...
Arial
To...
Cc...

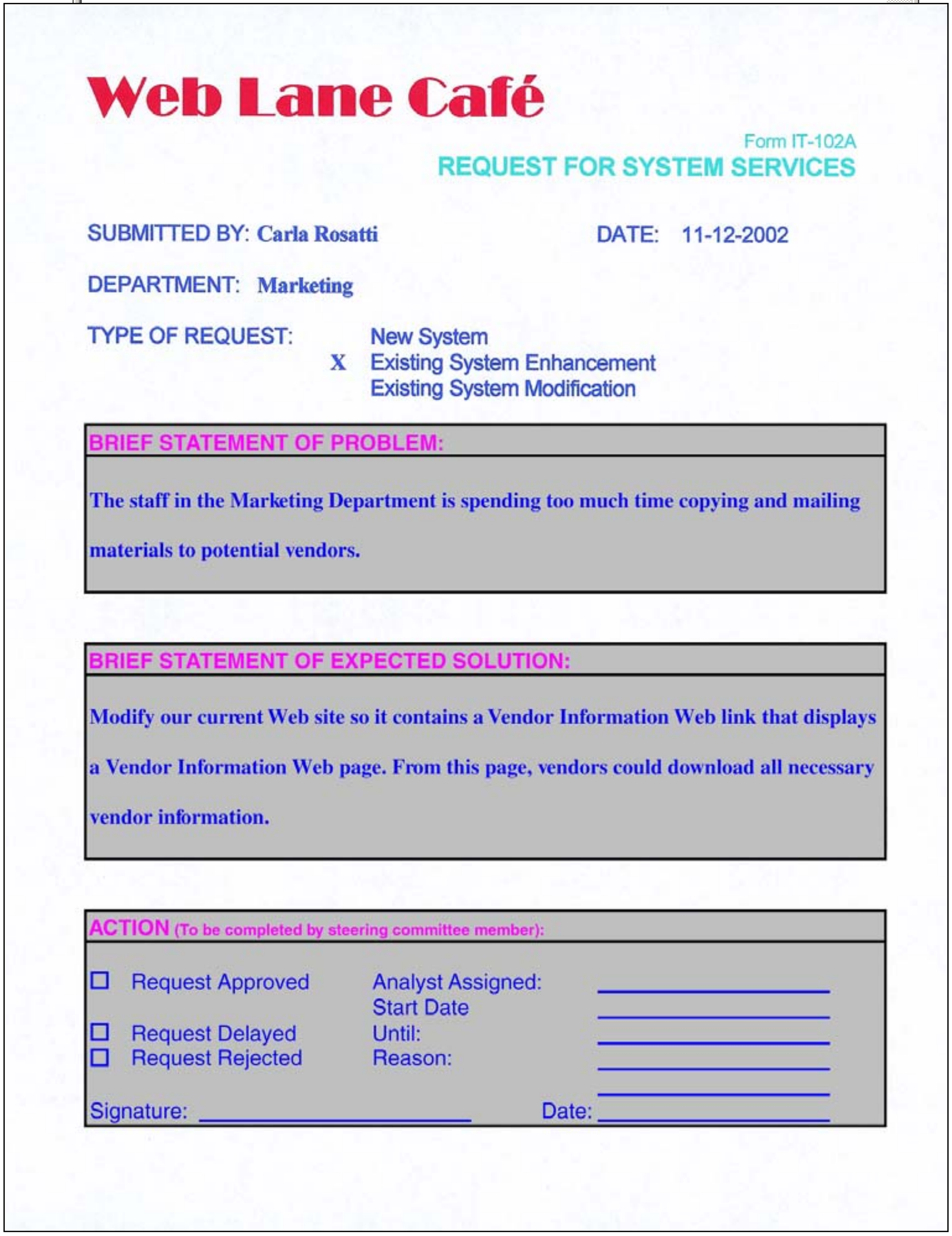
To: Greene@weblane.com

Subject: Project Request

Tyrone,

My staff is spending too much time copying and mailing materials to potential vendors. Can your staff develop a solution for me?

Thanks.
Carla



Web Lane Café

Form IT-102A
REQUEST FOR SYSTEM SERVICES

SUBMITTED BY: **Carla Rosatti** DATE: 11-12-2002

DEPARTMENT: **Marketing**

TYPE OF REQUEST:
New System
X Existing System Enhancement
Existing System Modification

BRIEF STATEMENT OF PROBLEM:

The staff in the Marketing Department is spending too much time copying and mailing materials to potential vendors.

BRIEF STATEMENT OF EXPECTED SOLUTION:

Modify our current Web site so it contains a Vendor Information Web link that displays a Vendor Information Web page. From this page, vendors could download all necessary vendor information.

ACTION (To be completed by steering committee member):

☐ Request Approved Analyst Assigned: ____________
Start Date ____________
☐ Request Delayed Until: ____________
☐ Request Rejected Reason: ____________

Signature: ____________ Date: ____________

Figure 14-7b (formal project request)

Figure 14-7 Sometimes users informally communicate a project request verbally or as an e-mail message. In larger companies, requests often are documented on a form such as this Request for System Services.

Web Lane Café — A Case Study

This chapter includes a case study to help you understand real-world SDLC applications. The case study appears shaded in yellow immediately after the discussion of each phase in the SDLC. The case is based on a fictitious company. The following paragraphs present a background on the Web Lane Café, a cybercafé. A **cybercafé** is a coffee house or restaurant that provides Web access to its customers.

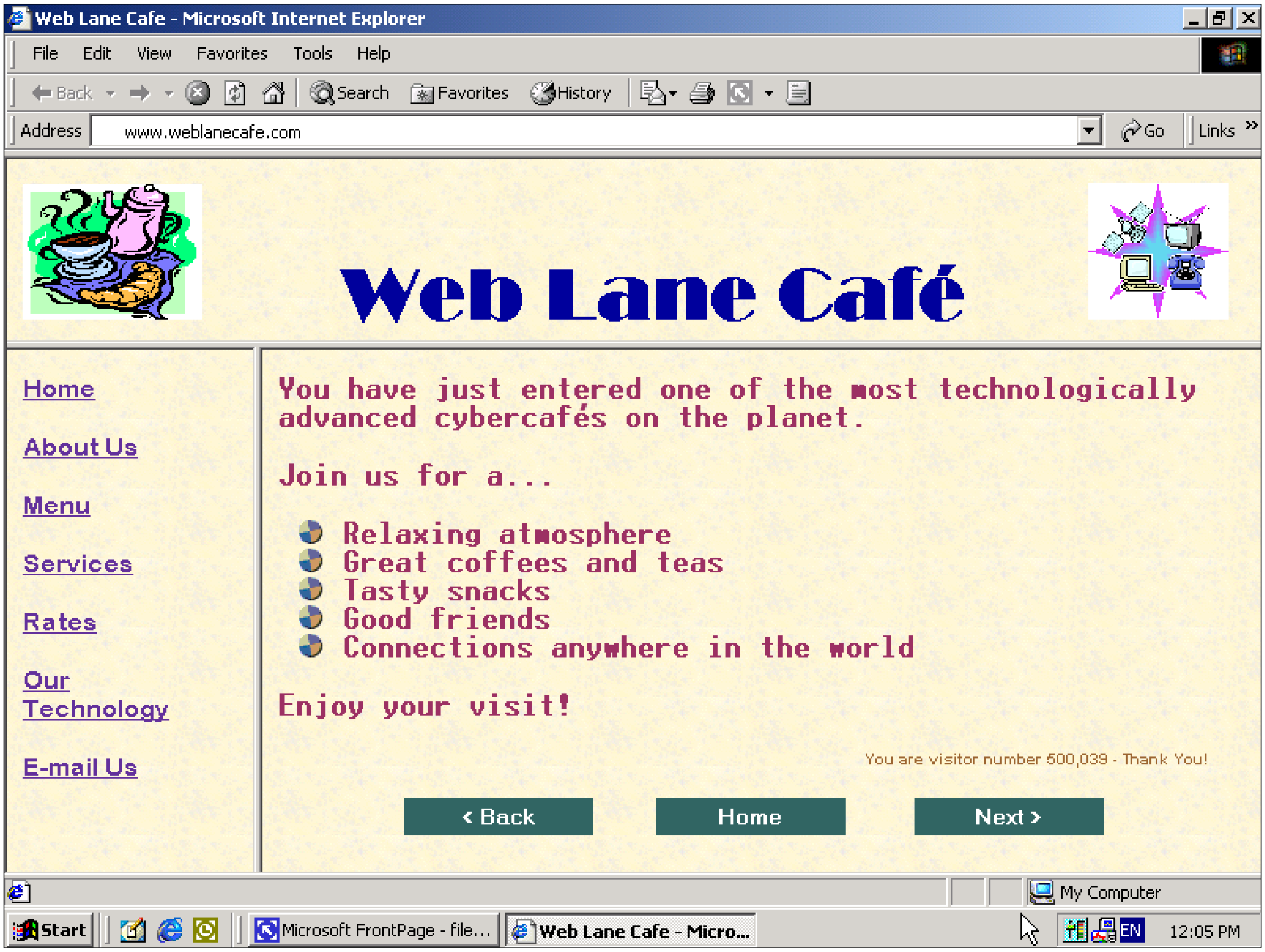
Web Lane Café is a worldwide chain of cybercafés. With locations in 40 cities around the world, Web Lane Café is one of the most technologically advanced cybercafés on the planet.

At these cafés, you can do the following: connect to the Web while drinking your favorite specialty coffee or tea and eating a snack; chat with or send e-mail to co-workers, friends, and family; use Internet Explorer, Netscape, or AOL to browse the Web; and play online games or read an online book.

If customers have questions while using the computer, any staff member can provide assistance. Each café also offers training courses for beginning computer users.

Through high-speed T1 lines, customers have fast Internet access. Monitors are 19”. Each café has a minimum of 15 computers, along with a color printer, a laser printer, a digital camera, and a scanner. All computers have popular productivity software such as Microsoft Office and Adobe PhotoShop. For each beverage or snack purchased, customers receive 30 minutes of free computer use — including Web access. If they would like additional computer time, the fee is $5.00 per hour.

Since Web Lane Café started operations in 1995, business has been thriving. The cafés serve thousands of customers around the world. The Web site (Figure 14-8) has hundreds of hits a day. John Simmons, chief information officer (CIO) for Web Lane Café, offers one suggestion for the company’s financial success. “We do not pay for the computers



You have just entered one of the most technologically advanced cybercafés on the planet.

Join us for a...

- Relaxing atmosphere
- Great coffees and teas
- Tasty snacks
- Good friends
- Connections anywhere in the world

Enjoy your visit!

You are visitor number 500,039 - Thank You!

Figure 14-8 To help you better understand real-world applications of the SDLC, this chapter presents a case study about Web Lane Café. At this cybercafé, you can connect to the Web while eating a snack and drinking your favorite specialty coffee or tea.

and equipment in our cafés. Instead, we allow computer vendors to use our café as a storefront for their products. This provides customers with the opportunity to try out the hardware and software before making a purchase. When customers wish to purchase computers, we direct them to the vendor's online storefront for discount pricing."

To showcase their hardware and software in the cafés, computer vendors request information from Carla Rosatti, the marketing manager. The number of these requests is rising quickly. The cost of copying and mailing this material is becoming excessive. For this reason, Carla would like this vendor information made available on the Web. Vendors could download information sheets, press releases, photographs, and other information from the Web site. Placing this information on the Web would save Carla and her staff a great deal of time and money.

Carla realizes this task will require substantial company resources. She believes a systems study is necessary. She sends an e-mail message to the vice president of information systems (Figure 14-7a on page 14.10). He agrees and tells her to fill out a Request for System Services form (Figure 14-7b) and submit it to Mohammed Hossain, chair of the steering committee at Web Lane Café.

PLANNING PHASE

The **planning phase** for a project begins when the steering committee receives a project request. As mentioned earlier in this chapter, the steering committee is a decision-making body for a company. This committee usually consists of five to nine people. It typically includes a mix of vice presidents, managers, nonmanagement users, and IT personnel.

During the planning phase, four major activities are performed: (1) review and approve the project requests, (2) prioritize the project requests, (3) allocate resources such as money, people, and equipment to approved projects, and (4) form a project development team for each approved project.

The projects that receive the highest priority are those mandated by management or some other governing body. These requests are given immediate attention. The steering committee evaluates the remaining project requests on the basis of their value to the company. The steering committee approves some projects and rejects others. Of the approved projects, it is likely that only a few will begin their SDLC immediately. Others will have to wait for additional funds or resources to become available.

Planning at Web Lane Café

After receiving the project request (Figure 14-7b on page 14.10) from Carla, Mohammed Hossain distributes it to all members of the steering committee. They will discuss the request at their next meeting. The steering committee members of Web Lane Café are as follows: Mohammed Hossain, controller and chair of the steering committee; Tracy Houck, vice president of operations; Jesse Martinez, Webmaster; Mae Ling, training specialist; Sadie Lapinski, senior systems analyst; and Tyrone Greene, vice president of information systems. Mohammed also invites Carla Rosatti to the next steering committee meeting. Because she originated the project request, Carla will have the knowledge to answer questions.

During the meeting, the committee decides the project request identifies an improvement to the system, instead of a problem. They feel the nature of the improvement (to make vendor information available on the Web) could lead to considerable savings for the company. It also will provide quicker service to potential vendors.

The steering committee approves the request. Mohammed points out the company has enough funds in its budget to begin the project immediately. Thus, Tyrone assembles a system development project team. He assigns Sadie Lapinski, senior systems analyst, as the project leader. Sadie and her team immediately begin the next phase: analysis.

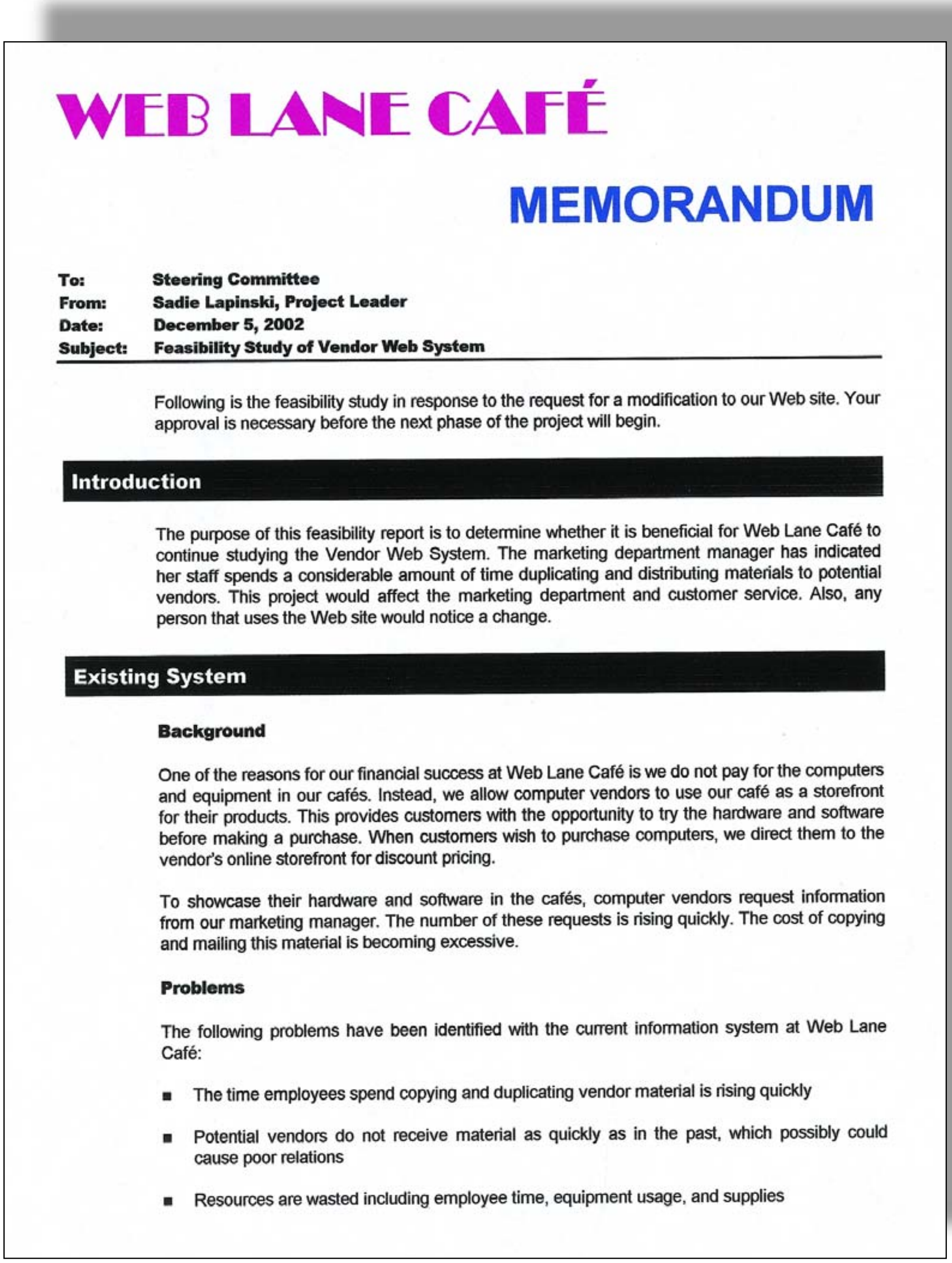
ANALYSIS PHASE

The **analysis phase** consists of two major tasks: (1) conduct a preliminary investigation and (2) perform detailed analysis. Detailed analysis has three activities: (1) study how the current system works; (2) determine the user's wants, needs, and requirements; and (3) recommend a solution.

The Preliminary Investigation

The purpose of the **preliminary investigation**, sometimes called the **feasibility study**, is to decide whether the problem or improvement in a project request is worth pursuing. Should the company continue to assign resources to this project? To answer this question, the systems analyst conducts a very general study of the project. Then the systems analyst presents his or her findings in a report. Figure 14-9 to the right and on the next page shows a sample feasibility report, also sometimes known as the feasibility study.

In this phase the systems analyst must define the problem or improvement accurately. The actual problem may be different from the one suggested in the project request. For example, suppose vendors complain that the marketing department takes too long to send customer names and addresses. An investigation might reveal the marketing department is not the problem. The problem exists because some cafés wait three weeks before sending customer names and addresses to the marketing department. Thus, the preliminary investigation determines the real problem,



WEB LANE CAFÉ

MEMORANDUM

To: **Steering Committee**
From: **Sadie Lapinski, Project Leader**
Date: **December 5, 2002**
Subject: **Feasibility Study of Vendor Web System**

Following is the feasibility study in response to the request for a modification to our Web site. Your approval is necessary before the next phase of the project will begin.

Introduction

The purpose of this feasibility report is to determine whether it is beneficial for Web Lane Café to continue studying the Vendor Web System. The marketing department manager has indicated her staff spends a considerable amount of time duplicating and distributing materials to potential vendors. This project would affect the marketing department and customer service. Also, any person that uses the Web site would notice a change.

Existing System

Background

One of the reasons for our financial success at Web Lane Café is we do not pay for the computers and equipment in our cafés. Instead, we allow computer vendors to use our café as a storefront for their products. This provides customers with the opportunity to try the hardware and software before making a purchase. When customers wish to purchase computers, we direct them to the vendor's online storefront for discount pricing.

To showcase their hardware and software in the cafés, computer vendors request information from our marketing manager. The number of these requests is rising quickly. The cost of copying and mailing this material is becoming excessive.

Problems

The following problems have been identified with the current information system at Web Lane Café:

- The time employees spend copying and duplicating vendor material is rising quickly
- Potential vendors do not receive material as quickly as in the past, which possibly could cause poor relations
- Resources are wasted including employee time, equipment usage, and supplies

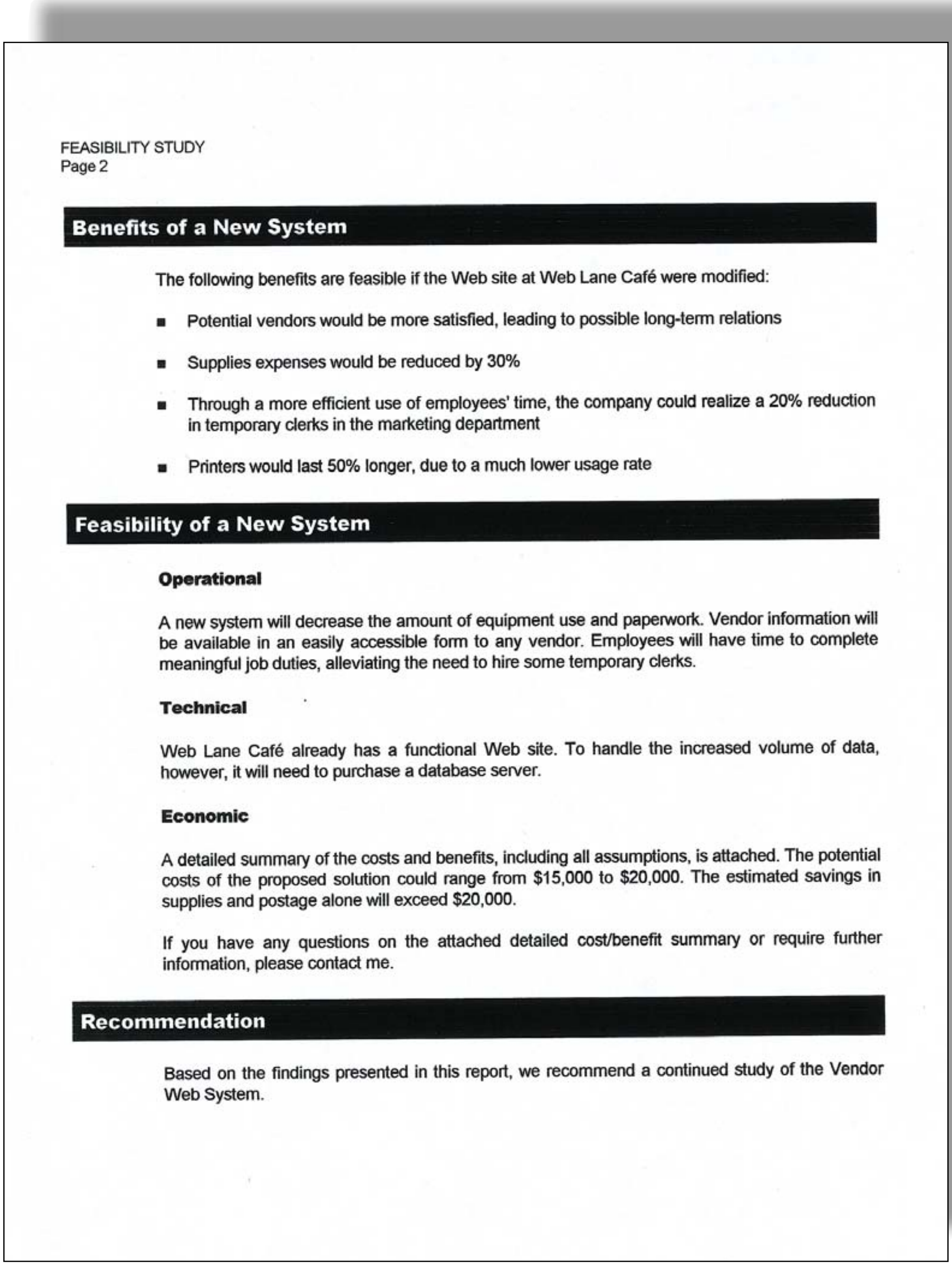
Figure 14-9 A feasibility report presents the results of the preliminary investigation. The report must be prepared professionally and be well organized to be effective. *(continued on the next page)*

which is the marketing department does not have instant access to the customer names and addresses.

The first step in the preliminary investigation is to interview the user who submitted the project request. In the case of the cybercafé, the marketing manager submitted the request. Depending on the nature of the request, project team members may interview other users too. A request, for example, might involve data or a process that affects more than one department. In the case of the cybercafé, members of the team might interview the controller for costs of copying and mailing materials. They also might interview one or two vendors.

In addition to interviewing, members of the project team may use other data gathering techniques such as reviewing existing documentation. The time spent on this phase of the SDLC is quite short when compared to the remainder of the project. Often, the preliminary investigation takes just a few days.

Upon completion of the preliminary investigation, the systems analyst writes the feasibility report. This report presents the team's findings to the steering committee. The feasibility report contains these major sections: introduction, existing system, benefits of a new system, feasibility of a new system, and the recommendation.



FEASIBILITY STUDY
Page 2

Benefits of a New System

The following benefits are feasible if the Web site at Web Lane Café were modified:

- Potential vendors would be more satisfied, leading to possible long-term relations
- Supplies expenses would be reduced by 30%
- Through a more efficient use of employees' time, the company could realize a 20% reduction in temporary clerks in the marketing department
- Printers would last 50% longer, due to a much lower usage rate

Feasibility of a New System

Operational

A new system will decrease the amount of equipment use and paperwork. Vendor information will be available in an easily accessible form to any vendor. Employees will have time to complete meaningful job duties, alleviating the need to hire some temporary clerks.

Technical

Web Lane Café already has a functional Web site. To handle the increased volume of data, however, it will need to purchase a database server.

Economic

A detailed summary of the costs and benefits, including all assumptions, is attached. The potential costs of the proposed solution could range from $15,000 to $20,000. The estimated savings in supplies and postage alone will exceed $20,000.

If you have any questions on the attached detailed cost/benefit summary or require further information, please contact me.

Recommendation

Based on the findings presented in this report, we recommend a continued study of the Vendor Web System.

Figure 14-9 *(continued)*

The introduction states the purpose of the report, the problem or improvement, and the scope of the project. The existing system section describes the background of the request and the problems or limitations of the current system. The next section identifies the benefits the company will realize from the proposed solution. The feasibility section assesses operational, schedule, technical, and economic feasibility of the proposed solution. The last section recommends whether the company should continue the project.

In some cases, the project team may recommend not to continue the project. In other words, the team considers the project infeasible. If the steering committee agrees, the project ends at this point. If, however, the project team recommends continuing and the steering committee approves this recommendation, then detailed analysis begins.

Analysis: Preliminary Investigation at Web Lane Café

Sadie Lapinski, senior systems analyst and project leader, meets with Carla Rosatti to discuss the project request. During the interview, Sadie looks at the material that Carla's staff sends to a potential vendor. She asks Carla how many vendor requests she receives in a month. Then Sadie interviews the controller, Mohammed Hossain, to obtain some general cost and benefit figures for the feasibility report. She also calls a vendor. She wants to know if the material Carla's department sends is helpful.

Next, Sadie prepares the feasibility report (Figure 14-9 on pages 14.13 and 14.14). After the project team members review it, Sadie submits it to the steering committee. The report recommends continuing into the detailed analysis phase for this project. The steering committee agrees. Sadie and her team begin detailed analysis.

Detailed Analysis

Detailed analysis involves three major activities: (1) study how the current system works, (2) determine the users' wants, needs, and requirements, and (3) recommend a solution. Detailed analysis sometimes is called **logical design** because the systems analysts develop the proposed solution without regard to any specific hardware or software. That is, they make no attempt to identify the procedures that should be automated and those that should be manual.

During these activities, systems analysts use all of the data and information gathering techniques. They review documentation, observe employees and machines, send questionnaires, interview employees, conduct joint-application design (JAD) sessions, and do research. An important benefit from these activities is they build valuable relationships among the systems analysts and users. The systems analyst has much more credibility with users if he or she understands their concerns. This point may seem obvious, but some developers create or modify systems with little or no user participation.

Structured Analysis and Design Tools

While studying the current system and identifying user requirements, the systems analyst collects a lot of data and information. A major task for the systems analyst is to document these findings in a way that can be understood by everyone. Both users and IT professionals will refer to this documentation.

Structured analysis and design is a technique that attempts to address this problem by using graphics and other tools. Structured analysis and design tools include entity-relationship diagrams, data flow diagrams, and the project dictionary. The following pages discuss these tools.

TECHNOLOGY TRAILBLAZER

ED **YOURDON**

Ed Yourdon is a self-proclaimed alligator trainer, daredevil parachutist, and Himalayan mountain climber. He is recognized in the Computer Hall of Fame and by CrossTalk as one of the 10 Influential Men and Women of Software. Yourdon also is noted for developing the method of object-oriented systems analysis and design.

Yourdon is the author of more than two-dozen computer books and 200 technical articles and the publisher of *American Programmer*. As chairman of the Cutter Consortium, he helps companies build and implement successful information technology strategies.

Subscribers to his weekly e-zine, *The Yourdon Report*, can read about the latest business trends and products in the software field. His Web site contains specific "community" pages for students, software professionals and managers, and book lovers, and it contains drafts of the second edition of his classic text, *Modern Structured Analysis*.

For more information on Ed Yourdon, visit the Discovering Computers 2002 People Web page (**scsite.com/dc2002/people.htm**) and click Ed Yourdon.

Web Link

For more information on entity-relationship diagrams, visit the Discovering Computers 2002 Chapter 14 WEB LINK page (**scsite.com/dc2002/ch14/weblink.htm**) and click Entity-Relationship Diagrams.

Web Link

For more information on data flow diagrams, visit the Discovering Computers 2002 Chapter 14 WEB LINK page (**scsite.com/dc2002/ch14/weblink.htm**) and click Data Flow Diagrams.

ENTITY-RELATIONSHIP DIAGRAMS

An **entity-relationship diagram** (**ERD** or **E-R diagram**) is a tool that graphically shows the connections between entities in a system (Figure 14-10). An **entity** is an object in the system that has data. For example, a cybercafé might have customer, order, menu item, computer, and vendor entities.

On the ERD, entity names usually are nouns. You write the entity name in all capital letters. Each relationship describes a connection between two entities. In Figure 14-10 a vendor supplies one or more computers to the cafés. A computer is supplied by a single vendor. A customer may or may not sit down and use one of these computers during a visit to the café. A customer, however, places an order. Some customers place multiple orders. Each order contains one or more items from the menu.

It is important the systems analyst has an accurate understanding of the system. The systems analyst reviews the ERD with the user. Once users approve the ERD, the systems analyst identifies data items associated with an entity. For example, the VENDOR entity might have these data items: Vendor Number, Vendor Name, Vendor Contact Name, Address, City, State, Postal Code, Telephone Number, and E-mail Address.

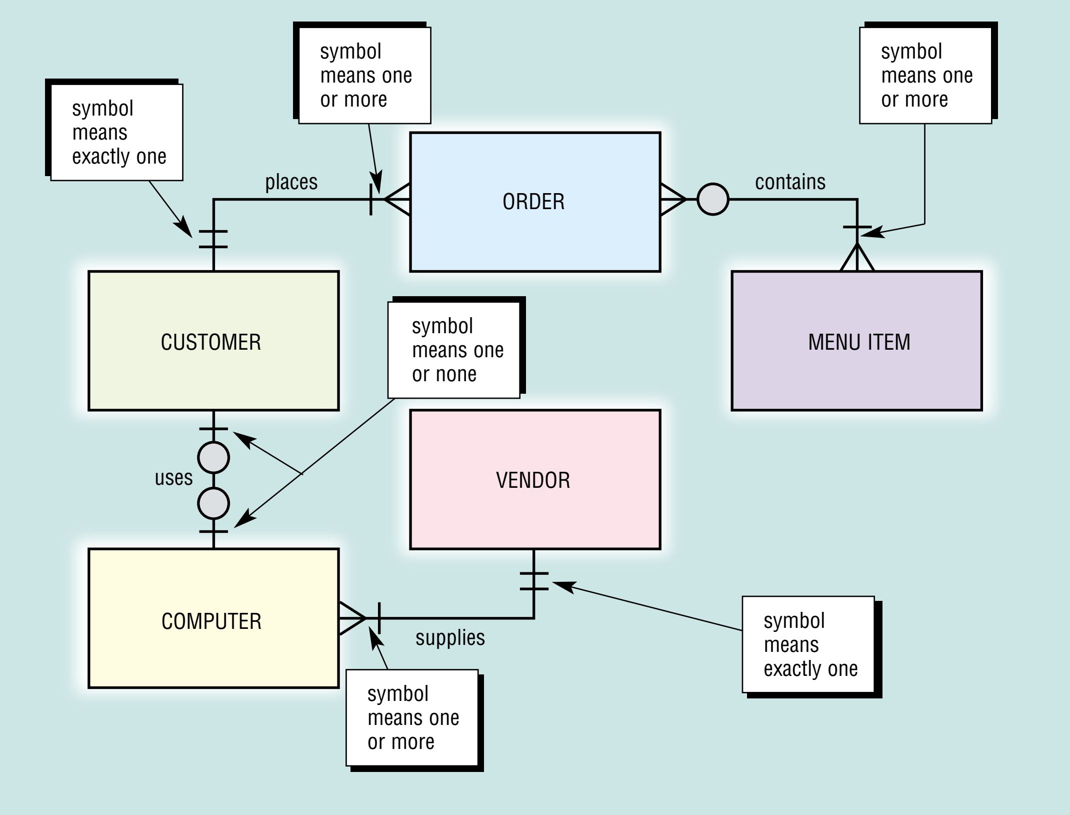


Figure 14-10 This ERD shows the relationships among entities in the Vendor Web System at Web Lane Café. A vendor supplies one or more computers to the cafés. A computer is supplied by a single vendor. A customer may or may not sit down and use one of these computers during a visit to the café. A customer, however, places an order. Some customers place multiple orders. Each order contains one or more items from the menu.

DATA FLOW DIAGRAMS A **data flow diagram** (**DFD**) is a tool that graphically shows the flow of data in a system. The key elements of a DFD are the data flows, the processes, the data stores, and the sources (Figure 14-11). A line with an arrow indicates a data flow. A **data flow** shows the input or output of data or information into or out from a process. A **process**, which is drawn as a circle, transforms an input data flow into an output data flow. A rectangle with no sides is a data store. A **data store** is a holding place for data and information. Examples of data stores are filing cabinets, checkbook registers, or electronic files in a computer. The squares on the DFD are sources. A **source**, or **agent**, identifies an entity outside the scope of the system. Sources send data into the system or receive information from the system.

Like ERDs, systems analysts often use DFDs to review processes with users. Systems analysts prepare DFDs on a level-by-level basis. The top level DFD, known as a **context diagram**, identifies only the major process. The context diagram shows the system being studied. Lower-level DFDs add detail and definition to the higher levels, similarly to zooming in on a computer screen. The lower-level DFDs then contain subprocesses. For example, Figure 14-11 shows a context diagram that contains the Vendor Web System process. This process might be split into three subprocesses: (1) gathering and organizing vendor information, (2) converting vendor information into electronic format, and (3) uploading the files to the Web page.

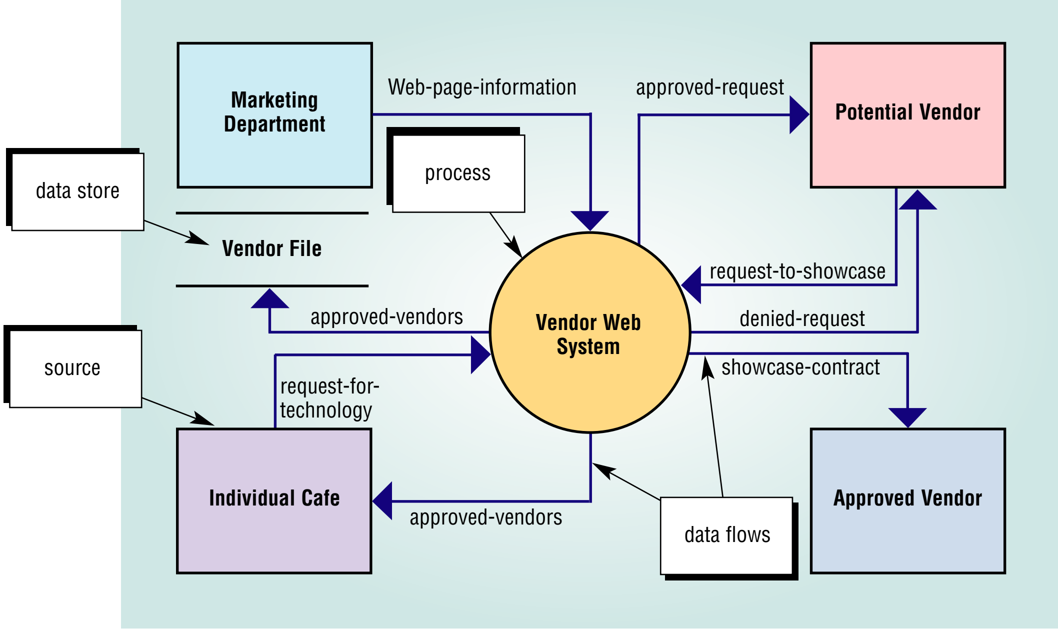


Figure 14-11 This data flow diagram, called the context diagram, has one process — the Vendor Web System being studied at Web Lane Café. The Vendor File is a data store. Sources both send and receive data and information to and from the system. For example, a café sends a request for technology (hardware and/or software) into the Vendor Web System. The Vendor Web System sends out a list of approved vendors for that technology. The list of approved vendors also is stored in the Vendor File.

PROJECT DICTIONARY The **project dictionary**, sometimes called the **repository**, contains all the documentation and deliverables of a project. The project dictionary helps everyone keep track of the huge amount of details in a system. The dictionary begins with the project request and includes diagrams such as the ERD and DFDs.

Another section of the dictionary explains every item found on these diagrams. Each process, data store, data flow, and source on every DFD has an entry in the project dictionary. Every entity on the ERD has an entry in the project dictionary. The dictionary also contains an entry for each data item associated with the entities. Some systems can be represented with 25 or more DFDs and have hundreds of data items. The number of entries added to the dictionary at this point can be enormous. As you might imagine, this activity requires a tremendous amount of time.

The system analyst uses a variety of techniques to enter these items in the project dictionary. Some of these include structured English, decision tables and decision trees, and the data dictionary.

Web Link

For more information on the project dictionary, visit the Discovering Computers 2002 Chapter 14 WEB LINK page (**scsite.com/dc2002/ch14/weblink.htm**) and click Project Dictionary.

STRUCTURED ENGLISH Each process on every DFD must have an entry in the project dictionary. Many systems analysts use structured English to explain the details of a process. **Structured English** is a style of writing that describes the steps in a process. Figure 14-12 shows an example of structured English that describes the process to upload files to a Web page.

DECISION TABLES AND DECISION TREES Sometimes, a process consists of many conditions or rules. In this case, the systems analyst may use a decision table or decision tree instead of structured English. A **decision table** is a table that lists a variety of conditions and the actions that correspond to each condition. A **decision tree** also shows conditions and actions, but it shows them graphically. Figures 14-13 and 14-14 show a decision table and decision tree for the same process: determining how to package files so the vendor can download them.

UPLOADING VENDOR INFORMATION

```
For each item containing vendor information, perform the following steps:
    If the item is not a computer file then
        Use the scanner to convert it into a file format.
    Copy the file into the Vendor Information folder on your hard disk.
Zip all new files in the Vendor Information folder into a single file.
Save the zipped file in a Web folder.
E-mail the Webmaster with the name of the zipped file.
```

Figure 14-12 Structured English is a technique used to describe a process in the project dictionary. This structured English example describes the process of uploading vendor information to a Web page. The indented text is part of the loop.

		RULES							
		1	2	3	4	5	6	7	8
CONDITIONS	Background check results (S = Satisfactory, U = Unsatisfactory)	S	S	S	S	U	U	U	U
	References furnished?	Y	Y	N	N	Y	Y	N	N
	Passed credit check?	Y	N	Y	N	Y	N	Y	N
ACTIONS	Vendor approved	X							
	Vendor not approved					X	X	X	X
	Waiting for additional information		X	X	X				

Figure 14-13 This decision table describes the policy for determining whether vendors are approved to showcase their products at Web Lane Café. A vendor is approved if they meet all conditions in Rule #1. For example, vendors are approved if their background check results are satisfactory, they have furnished all of their references, and have passed a credit check.

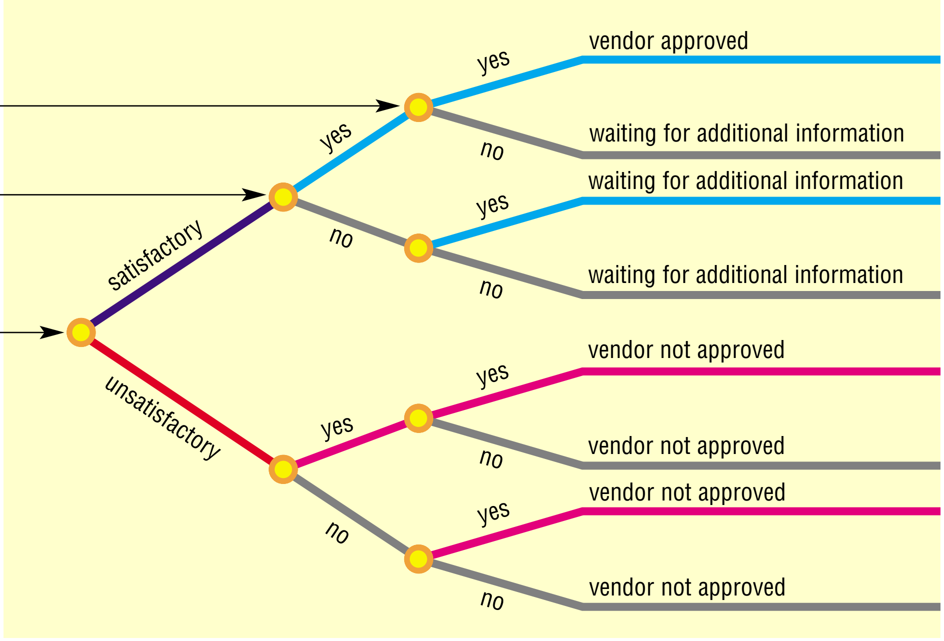


Figure 14-14 Some systems analysts prefer decision trees instead of decision tables because decision trees are graphical. The decision tree in this figure shows the same conditions as the decision table in Figure 14-13.

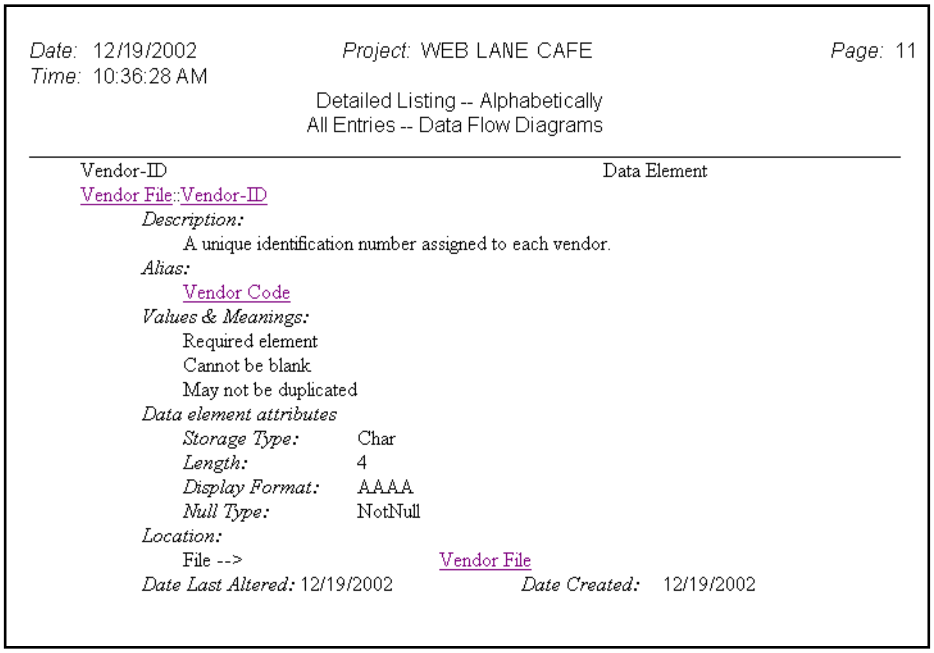
DATA DICTIONARY Each data item has an entry in the data dictionary section of the project dictionary (Figure 14-15). As discussed earlier in this chapter, the **data dictionary** stores the data item's name, description, and other details about each data item. The systems analyst creates the data dictionary during detailed analysis. In later phases of the SDLC, the systems analyst refers to and updates the data dictionary.

The System Proposal

At this point, the systems analyst has studied the current system and determined all user requirements. The next step is to communicate possible solutions for the project in a system proposal. The purpose of the **system proposal** is to assess the feasibility of each alternative solution and then recommend the most feasible solution for the project. The systems analyst re-evaluates feasibility at this point in the SDLC, especially economic feasibility. The systems analyst presents the system proposal to the steering committee. If the steering committee approves a solution, the project enters the design phase.

When the steering committee discusses the system proposal and decides which alternative to pursue, it often is deciding whether to buy packaged software from an outside source, build its own custom software, or hire an outside firm to handle more or all of its IT needs.

PACKAGED SOFTWARE **Packaged software**, sometimes called **commercial off-the-shelf software**, is pre-written software available for purchase. Packaged software is available for different types of computers. Chapter 3 presented



Date: 12/19/2002 *Project:* WEB LANE CAFE *Page:* 11
Time: 10:36:28 AM

Detailed Listing -- Alphabetically
All Entries -- Data Flow Diagrams

Vendor-ID Data Element
Vendor File::Vendor-ID
Description:
A unique identification number assigned to each vendor.
Alias:
Vendor Code
Values & Meanings:
Required element
Cannot be blank
May not be duplicated
Data element attributes

Storage Type:	Char
Length:	4
Display Format:	AAAA
Null Type:	NotNull

Location:
File --> Vendor File
Date Last Altered: 12/19/2002 *Date Created:* 12/19/2002

Figure 14-15 The data dictionary records information about each of the data items that make up the data flows and entities in the system. This is a dictionary entry for the Vendor ID data element.

ISSUE

Why Should We Change?

The System Proposal and Changing Requirements

Following completion of the analysis phase of the SDLC, the systems analyst submits a written report. This report explains why an investigation of the current system was performed, describes the problems that were found, outlines possible solutions, and the actions recommended. Some authorities find that after the report is completed, the analysts resist any changes suggested by the user. Why do you think this is true? Under what circumstances should an analyst consider changes recommended by a user? Why? Should suggested changes ever be ignored? Why or why not?

For more information on the system proposal, visit the Discovering Computers 2002 Issues Web page (**scsite.com/dc2002/issues.htm**) and click Chapter 14 Issue #2.

numerous application packages available for personal computers. These include word processing, spreadsheet, database, desktop publishing, paint/image editing, Web page authoring, personal finance, legal, tax preparation, educational/reference, e-mail, and Web browser software.

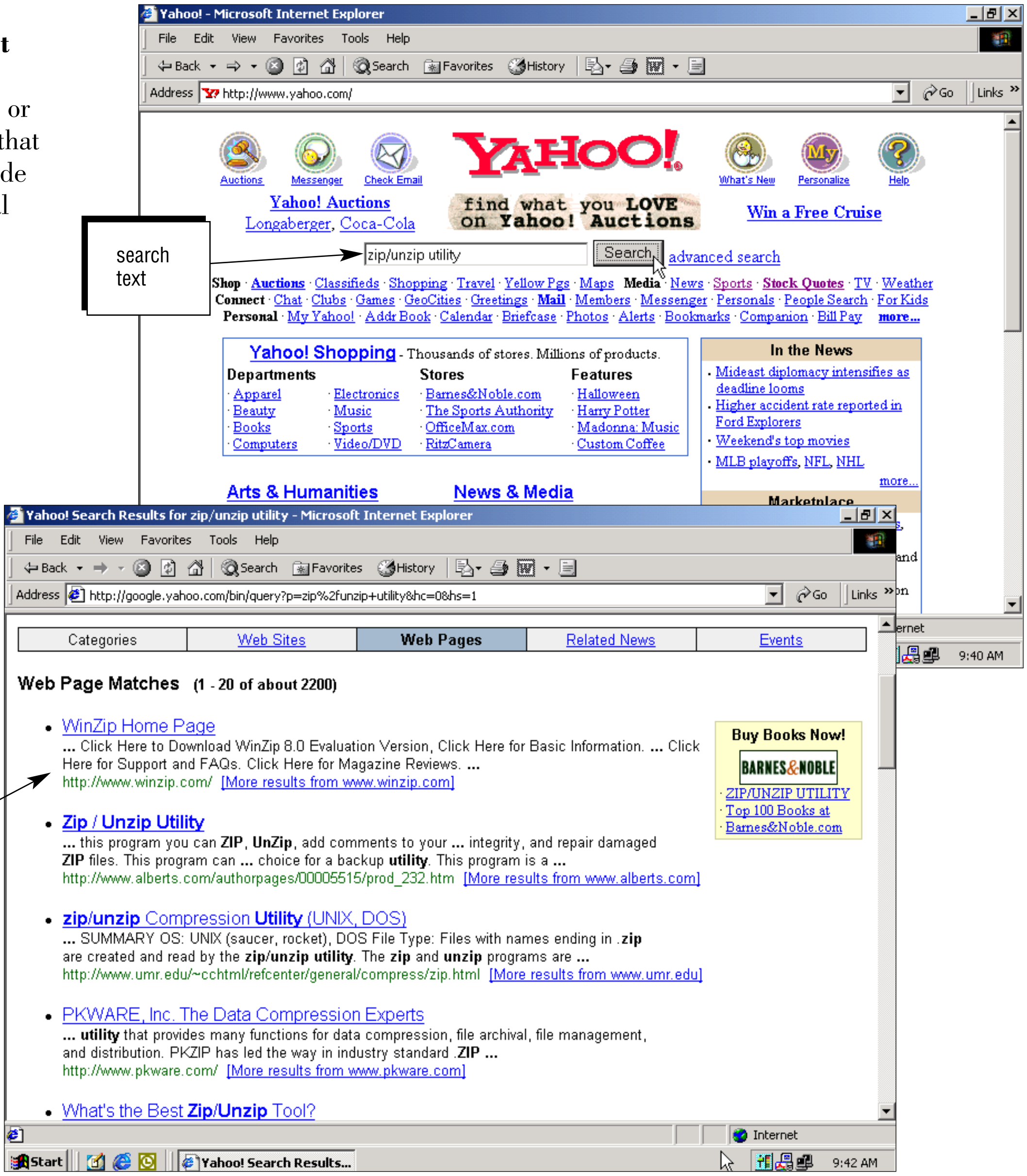
Vendors offer two types of packaged software: horizontal and vertical. **Horizontal market software** is software that meets the needs of many different types of companies. The applications presented in Chapter 3 were horizontal. If a company has a unique way of accomplishing activities, then it also may require vertical market software. **Vertical market software** is software specifically designed for a particular business or industry. Examples of companies that use vertical market software include real estate offices, libraries, dental offices, insurance companies, and construction firms. Each of these industries has unique information processing requirements.

Horizontal market software packages tend to be widely available because a large number of companies use them. Thus, they typically are less expensive than vertical market software packages. You can search for names and vendors of vertical and horizontal market packages on the Web simply by entering your requirement as the search criteria (Figure 14-16). Other sources for names of vendors include computer magazines and trade publications. A **trade publication** is a magazine written for a specific business or industry. Companies and individuals who have written software for these industries often advertise in trade publications.

CUSTOM SOFTWARE Instead of buying packaged software, some companies opt to write their own applications. Application software developed by the user or at the user's request is called **custom software**. With so many software packages

Web Link

For more information on vertical market software, visit the Discovering Computers 2002 Chapter 14 WEB LINK page (**scsite.com/dc2002/ch14/weblink.htm**) and click Vertical Market Software.


search text
search results
Yahoo! - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://www.yahoo.com/
Go Links
Auctions
Messenger
Check Email
YAHOO!
What's New
Personalize
Help
Yahoo! Auctions
Longaberger, Coca-Cola
find what you LOVE on Yahoo! Auctions
Win a Free Cruise
zip/unzip utility
Search
advanced search
Shop · Auctions · Classifieds · Shopping · Travel · Yellow Pgs · Maps Media · News · Sports · Stock Quotes · TV · Weather
Connect · Chat · Clubs · Games · GeoCities · Greetings · Mail · Members · Messenger · Personals · People Search · For Kids
Personal · My Yahoo! · Addr Book · Calendar · Briefcase · Photos · Alerts · Bookmarks · Companion · Bill Pay more...
Yahoo! Shopping - Thousands of stores. Millions of products.
Departments
Apparel
Beauty
Books
Computers
Electronics
Music
Sports
Video/DVD
Stores
Barnes&Noble.com
The Sports Authority
OfficeMax.com
RitzCamera
Features
Halloween
Harry Potter
Madonna: Music
Custom Coffee
In the News
Mideast diplomacy intensifies as deadline looms
Higher accident rate reported in Ford Explorers
Weekend's top movies
MLB playoffs, NFL, NHL
more...
Marketplace
Arts & Humanities
News & Media
9:40 AM
Yahoo! Search Results for zip/unzip utility - Microsoft Internet Explorer
Address http://google.yahoo.com/bin/query?p=zip%2funzip+utility&hc=0&hs=1
Categories
Web Sites
Web Pages
Related News
Events
Buy Books Now!
BARNES&NOBLE
ZIP/UNZIP UTILITY
Top 100 Books at Barnes&Noble.com
Internet
Start
Yahoo! Search Results...
9:42 AM

Web Page Matches (1 - 20 of about 2200)

- WinZip Home Page
  ... Click Here to Download WinZip 8.0 Evaluation Version, Click Here for Basic Information. ... Click Here for Support and FAQs. Click Here for Magazine Reviews. ...
  http://www.winzip.com/ [More results from www.winzip.com]
- **Zip / Unzip Utility**
  ... this program you can **ZIP**, **UnZip**, add comments to your ... integrity, and repair damaged **ZIP** files. This program can ... choice for a backup **utility**. This program is a ...
  http://www.alberts.com/authorpages/00005515/prod_232.htm [More results from www.alberts.com]
- **zip/unzip** Compression **Utility** (UNIX, DOS)
  ... SUMMARY OS: UNIX (saucer, rocket), DOS File Type: Files with names ending in .**zip** are created and read by the **zip/unzip utility**. The **zip** and **unzip** programs are ...
  http://www.umr.edu/~cchtml/refcenter/general/compress/zip.html [More results from www.umr.edu]
- PKWARE, Inc. The Data Compression Experts
  ... **utility** that provides many functions for data compression, file archival, file management, and distribution. PKZIP has led the way in industry standard .**ZIP** ...
  http://www.pkware.com/ [More results from www.pkware.com]
- What's the Best **Zip/Unzip** Tool?

Figure 14-16 You can use Yahoo! or any other search engine on the Internet to locate vendors of application software packages. This search of zip/unzip utilities returned thousands of matches.

available, why would a company choose to write its own application software? Sometimes a company cannot find a package that meets all its needs because its software requirements are so unique. The company can develop the software in-house using its own IT personnel or have an outside source develop it for them.

The main advantage of custom software is it matches the company's requirements exactly. The disadvantages are usually it is more expensive and takes longer to design and implement than packaged software.

SOLUTIONS PROVIDERS Instead of outsourcing just the software portion of a project, some companies outsource more or all of their IT operation. They do this to remain competitive in this age of constantly changing technology. Every company should have a Web site that includes the latest technology. Many IT departments do not have the expertise to manage an entire Web operation, so they hire a firm that dedicates themselves to providing these special services.

Depending on your needs, solutions providers can handle as much or as little of your IT requirements as you desire. They can provide hardware and software. Some provide office space. Others provide a variety of services such as Web design and development, Web hosting, sales, marketing, billing, customer service, and legal assistance. A solutions provider that specializes in assisting Web-based companies with starting business operations often is called an **incubator**.

Detailed Analysis at Web Lane Café

Sadie and her team begin performing the activities in the detailed analysis phase of the Vendor Web System. As part of the study and requirements activities, they use several of the data and information gathering techniques available to them. They interview employees throughout the company and meet with some vendors. They observe the marketing staff copy and mail vendor information. They prepare many documents to record their findings: an entity-relationship diagram (see Figure 14-10 on page 14.16), a data flow diagram (see Figure 14-11 on page 14.17), a process specification using structured English (see Figure 14-12 on page 14.18), a process specification using a decision table (see Figure 14-13 on page 14.18), and a data dictionary entry for the Vendor-ID data item (see Figure 14-15 on page 14.19). These documents all become part of the project notebook. Members of the project team refer to these documents during the remainder of the SDLC.

After two months of studying the existing system and obtaining user requirements, Sadie discusses her findings with her supervisor, Tyrone Green. Sadie recommends their current Web site now include a link to Vendor Information. When someone clicks this link, a Vendor Information page will display. This Web page should contain all information that the marketing department usually sends to a vendor.

Based on Sadie's findings, Tyrone writes a system proposal for the steering committee to review. Jesse Martinez, Webmaster at Web Lane Café, developed the current Web site. Thus, Tyrone recommends that Jesse's staff modify the Web site in house. Tyrone also recommends Web Lane Café invest in a larger database server to handle the additional vendor information.

The steering committee agrees with Tyrone's proposal. Sadie and her team begin the design phase of the project.

DESIGN PHASE

The **design phase** consists of two major activities: (1) if necessary, acquire hardware and software and (2) develop all of the details of the new or modified information system. The systems analyst often performs these two activities at the same time instead of sequentially.

Acquiring Necessary Hardware and Software

Once the steering committee approves a solution, the systems analyst begins the activity to obtain additional hardware or software. The systems analyst may skip this activity if the approved solution does not require new hardware or software. If this activity is required, the selection of appropriate products is crucial for the success of the information system. The activity consists of four major tasks: (1) identify technical specifications, (2) solicit vendor proposals, (3) test and evaluate vendor proposals, and (4) make a decision.

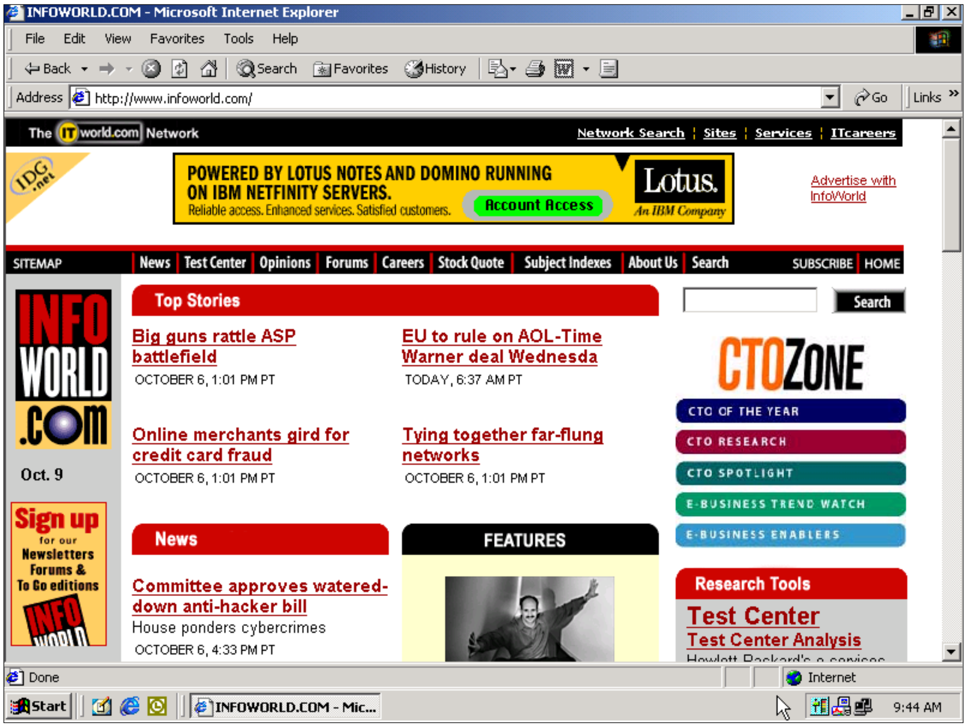
Web Link

For more information on incubators, visit the Discovering Computers 2002 Chapter 14 WEB LINK page (**scsite.com/dc2002/ch14/weblink.htm**) and click Incubators.

Identifying Technical Specifications

The first step in acquiring necessary hardware and software is to identify all the hardware and software requirements of the new or modified system. To do this, the systems analysts use a variety of research techniques. They talk with other systems analysts, visit vendors' stores, and surf the Web. Many printed trade journals, newspapers, and magazines provide some or all of their printed content as e-zines (Figure 14-17). An **e-zine** (pronounced ee-zeen), or **electronic magazine**, is a publication available on the Web. By using the Web, the systems analyst can locate information more quickly and easily than in the past.

Once the systems analyst defines the technical requirements, the next step is to summarize these requirements for potential vendors. The systems analyst can use three basic types of documents for this purpose. A **request for quotation (RFQ)** identifies the product(s) you want. With an RFQ, the vendor quotes a price for the listed product(s).


INFOWORLD.COM - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://www.infoworld.com/
Go Links
The IT world.com Network
Network Search | Sites | Services | ITcareers
POWERED BY LOTUS NOTES AND DOMINO RUNNING ON IBM NETFINITY SERVERS.
Reliable access. Enhanced services. Satisfied customers.
Account Access
Lotus. An IBM Company
Advertise with InfoWorld
SITEMAP News Test Center Opinions Forums Careers Stock Quote Subject Indexes About Us Search SUBSCRIBE HOME
INFO WORLD .COM
Oct. 9
Sign up for our Newsletters Forums & To Go editions
Top Stories
Search
CTOZONE
CTO OF THE YEAR
CTO RESEARCH
CTO SPOTLIGHT
E-BUSINESS TREND WATCH
E-BUSINESS ENABLERS
News
FEATURES
Research Tools
Test Center
Test Center Analysis
Done
Internet
Start
INFOWORLD.COM - Mic...
9:44 AM

Big guns rattle ASP battlefield
OCTOBER 6, 1:01 PM PT

EU to rule on AOL-Time Warner deal Wednesda
TODAY, 6:37 AM PT

Online merchants gird for credit card fraud
OCTOBER 6, 1:01 PM PT

Tying together far-flung networks
OCTOBER 6, 1:01 PM PT

Committee approves watered-down anti-hacker bill
House ponders cybercrimes
OCTOBER 6, 4:33 PM PT

Figure 14-17 The systems analyst can save much time by researching on the Internet. Many printed trade journals and magazines, such as the one shown in this figure, provide some or all of their content as e-zines on the Web.

Web Link

For more information on e-zines, visit the Discovering Computers 2002 Chapter 14 WEB LINK page (**scsite.com/dc2002/ch14/weblink.htm**) and click E-Zines.

APPLY IT!

Searching for Magazines, Newspapers, and Companies

As you progress through your educational pursuits, you will encounter many instances where your instructor will require you to do some research for a term paper or other project. Or, perhaps you have a personal project for which you need some information. You may be familiar with and use popular search engines such as Yahoo!, Alta Vista, and others. You may be unaware, however, that many specialty search sites also exist. The three following described specialty sites provide links to current articles and may be useful especially if your topic is business or information technology.

- **InfoJump** (see URL below) – A search engine for magazines and newspapers; contains links to more than five million newspaper/magazine articles and a database of more than 4,000 electronic periodicals.
- **1st Headlines** (see URL below) – A site that links to thousands of headline news stories each day from more than 300 newspapers, broadcasts, and online sources; users also can browse current stories in any other topic area.
- **WorldWide Business Exchange** (see URL below) – A site that contains links to more than 60,000 companies listed by name, city, state, postal code, area code, county, and by SIC code; includes e-mail address and products and services offered by each company.

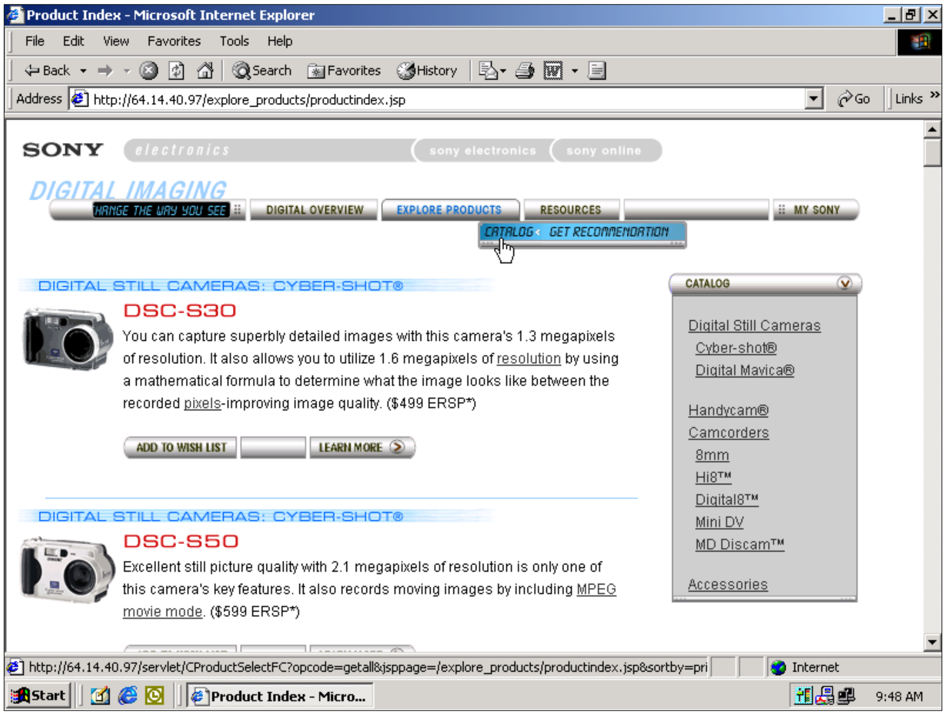
For more information on search engines and the Web sites mentioned above, visit the Discovering Computers 2002 Apply It Web page (**scsite.com/dc2002/apply.htm**) and click Chapter 14 Apply It #2.

With a **request for proposal** (**RFP**), the vendor selects the product(s) that meets your requirements and then quotes the price(s). Several software packages exist that assist you in creating a professional RFP. Just as the depth of an information system varies, so does the length of an RFQ or RFP. Some can be as short as a couple of pages. Others consist of more than one hundred pages. Instead of an RFQ or RFP, some companies prefer to use a request for information. A **request for information** (**RFI**) is a less formal method that uses a standard form to request information about a product or service.

Soliciting Vendor Proposals

You send the RFQ, RFP, or RFI to potential hardware and software vendors. The systems analyst has a variety of ways to locate vendors. Many vendors publish their product catalogs on the Internet. These online catalogs provide you with up-to-date and easy access to products, prices, technical specifications, and ordering information (Figure 14-18). If you are unable to locate a vendor on the Internet, you could visit local computer stores or contact computer manufacturers.

Another source for hardware and software products is a value-added reseller. A **value-added reseller** (**VAR**) is a company that purchases products from manufacturers and then resells these products to the public – offering additional services with the product. Examples of additional services include user support, equipment maintenance, training, installation, and warranties. A **warranty** is a guarantee that a product will function properly for a specified time period. If the product is defective or does not function properly, the warranty specifies how it will be repaired or replaced. Warranties from VARs generally are better than those provided by individual vendors.



You can capture superbly detailed images with this camera's 1.3 megapixels of resolution. It also allows you to utilize 1.6 megapixels of resolution by using a mathematical formula to determine what the image looks like between the recorded pixels-improving image quality. ($499 ERSP*)

Excellent still picture quality with 2.1 megapixels of resolution is only one of this camera's key features. It also records moving images by including MPEG movie mode. ($599 ERSP*)

Figure 14-18 Many hardware and software vendors post their product and services catalogs on the Web. This figure shows Sony's digital imaging catalog.

Web Link

For more information on a request for proposal, visit the Discovering Computers 2002 Chapter 14 WEB LINK page (**scsite.com/dc2002/ch14/weblink.htm**) and click Request for Proposal.

APPLY IT!

Evaluating Warranties

When a company makes a large hardware purchase, they solicit and evaluate proposals. A warranty is an important element within the proposal and is one of the main considerations a company uses to judge which proposal to accept. You can use and apply this same process. Suppose you are ready to purchase a computer. You have made some basic decisions about the amount of memory, the speed of the processor, the monitor size, and more. The three vendors you are considering include Compaq, Dell, and Gateway. Your next step is a comparison of the warranties. Think about the following items before you make your final decision:

- **Time limit** – Does the vendor offer a one-year, two-year, or other extended warranty? Can you purchase additional time?
- **Effective date** – When does the warranty become effective? From the date of purchase? From the date of receipt?
- **Coverage** – What specifically does the warranty cover? Software? Additional hardware that you may have purchased?
- **Return** – If you return the computer for repair, for what arrangements and costs are you responsible? Can you return equipment to a local store? If you must ship it, who pays the shipping charges? What about insurance? If required, who is responsible for this cost?
- **Used parts** – Does the vendor replace defective parts with reconditioned parts?

For more information on warranties, visit the Discovering Computers 2002 Apply It Web page (**scsite.com/dc2002/apply.htm**) and click Chapter 14 Apply It #3.

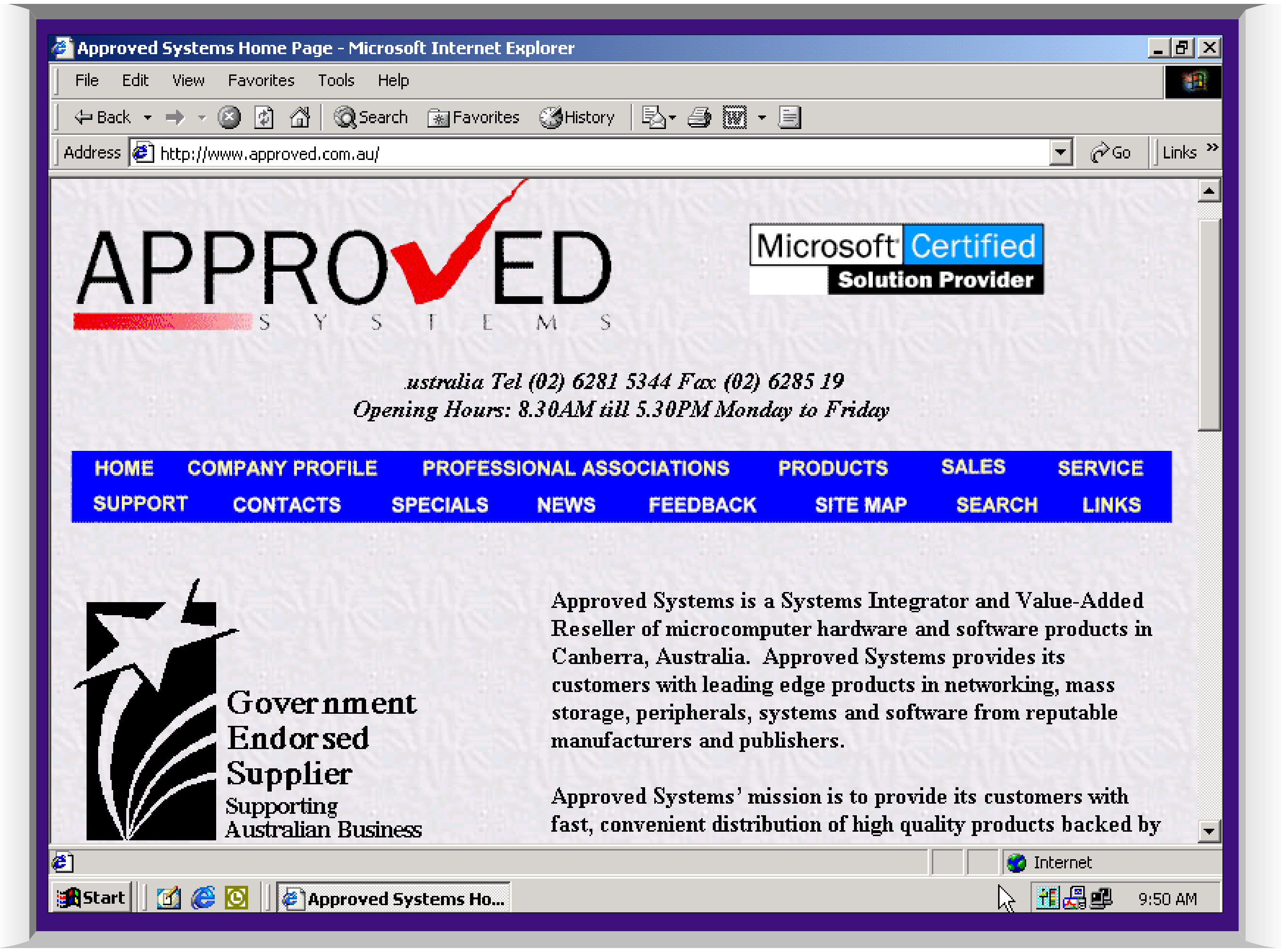
To be an authorized VAR, most manufacturers have requirements the VAR must meet. Various terms that identify a VAR's relationship with a manufacturer are strategic partner, business partner, authorized reseller, or solutions provider. Some VARs offer one product or service. Others provide complete systems, also known as a **turnkey solution** (Figure 14-19). The advantage of a full-service VAR is you deal with only one company for an entire system.

Instead of dealing with the vendor, some companies hire a computer consultant. Many consultants specialize in configuring hardware and software for businesses of all sizes. For a reliable consultant reference, contact a professional organization in your industry, a local university, the yellow pages, the Web, or a local newspaper.

Testing and Evaluating Vendor Proposals

After sending RFQs and RFPs to potential vendors, you will receive completed quotations and proposals. A difficult task is to evaluate the proposals and then select the best one. Many systems analysts use a scoring system to rate each proposal. It is important to be as objective as possible while rating each proposal.

You can use many techniques to test the various software products from vendors. Obtain a list of user references from the software vendors. Talk to current users of the software for their opinions. Ask the vendor for a demonstration of the product(s) specified. If you wish to test the software yourself, ask the vendor if they have a demonstration copy. Some


Approved Systems Home Page - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://www.approved.com.au/
Go Links
APPROVED SYSTEMS
Microsoft Certified Solution Provider
HOME COMPANY PROFILE PROFESSIONAL ASSOCIATIONS PRODUCTS SALES SERVICE
SUPPORT CONTACTS SPECIALS NEWS FEEDBACK SITE MAP SEARCH LINKS
Government Endorsed Supplier
Supporting Australian Business
Internet
Start
Approved Systems Ho...
9:50 AM

ustralia Tel (02) 6281 5344 Fax (02) 6285 19
Opening Hours: 8.30AM till 5.30PM Monday to Friday

Approved Systems is a Systems Integrator and Value-Added Reseller of microcomputer hardware and software products in Canberra, Australia. Approved Systems provides its customers with leading edge products in networking, mass storage, peripherals, systems and software from reputable manufacturers and publishers.

Approved Systems' mission is to provide its customers with fast, convenient distribution of high quality products backed by

Figure 14-19 When searching for hardware and software vendors, the Internet is an excellent resource. Many VARs advertise their services on the Internet. This figure shows the home page for Approved Systems, which provides complete systems to Australian businesses.

vendors even allow you to download or run a demonstration copy directly from their Web site (Figure 14-20).

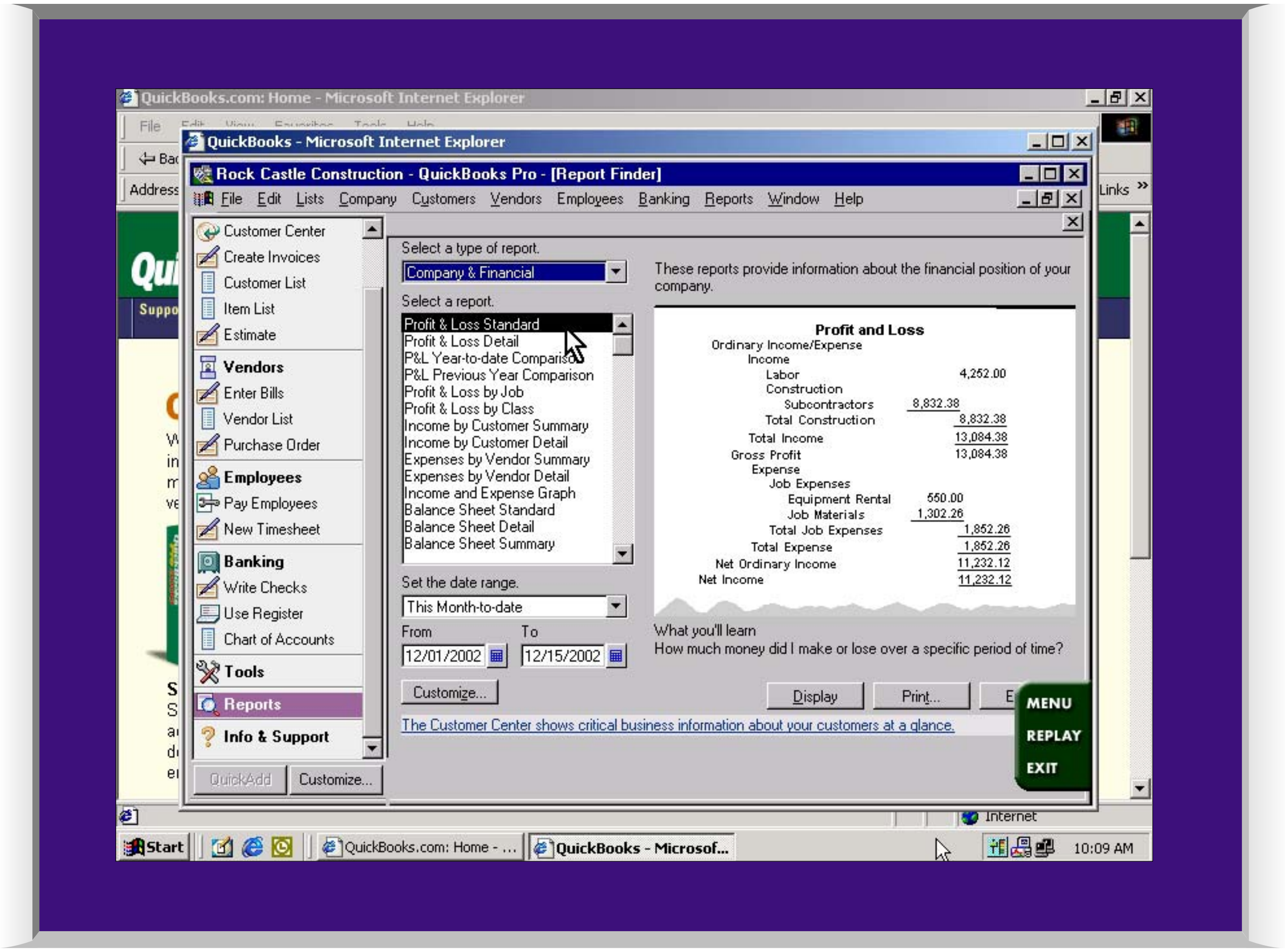
You may be concerned about whether the software can handle a certain volume of transactions efficiently. In this case, you can conduct a benchmark test. A **benchmark test** measures the performance of hardware or software. For example, a benchmark test could measure the time it takes a payroll package to print 50 paychecks. Comparing the time it takes various accounting packages to print the same 50 paychecks is one way of measuring each package's performance. Some computer magazines conduct benchmark tests while evaluating hardware and software and then publish these results for consumers to review.

Making a Decision

Having rated the proposals, the systems analyst presents a recommendation to the steering committee. The recommendation could be to award a contract to a vendor or to not make any purchases at this time.

Web Link

For more information on benchmark tests, visit the Discovering Computers 2002 Chapter 14 WEB LINK page (**scsite.com/dc2002/ch14/weblink.htm**) and click Benchmark Tests.



Select a type of report. Company & Financial

These reports provide information about the financial position of your company.

Select a report. Profit & Loss Standard

Set the date range. This Month-to-date

From 12/01/2002 To 12/15/2002

Profit and Loss

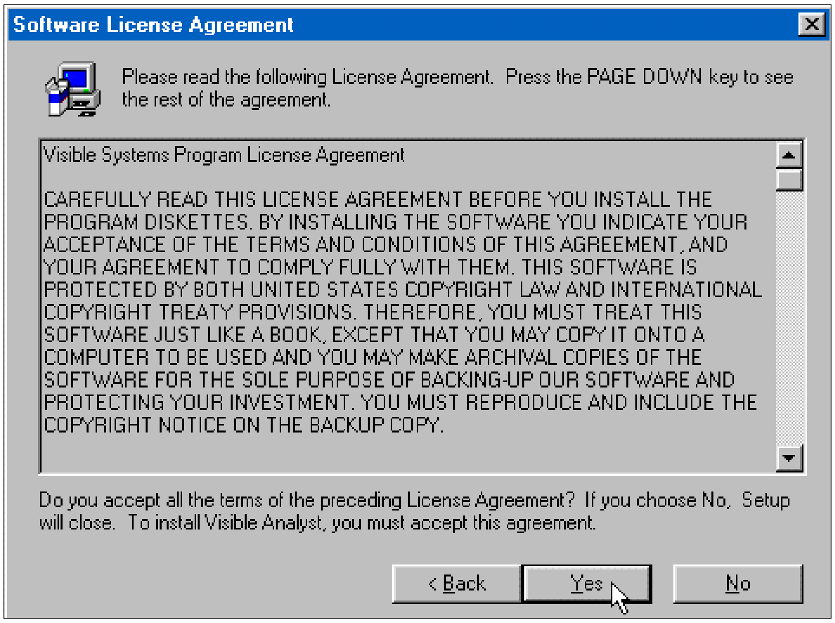
Ordinary Income/Expense		
Income		
Labor		4,252.00
Construction		
Subcontractors	8,832.38	
Total Construction		8,832.38
Total Income		13,084.38
Gross Profit		13,084.38
Expense		
Job Expenses		
Equipment Rental	550.00	
Job Materials	1,302.26	
Total Job Expenses		1,852.26
Total Expense		1,852.26
Net Ordinary Income		11,232.12
Net Income		11,232.12

What you'll learn
How much money did I make or lose over a specific period of time?

The Customer Center shows critical business information about your customers at a glance.

Figure 14-20 Many times, you will want to test software. Some vendors allow you to run a demonstration copy directly from their Web site. For example, Intuit has a demo of QuickBooks.

When you purchase hardware, you own it. When you purchase software, you do not. With software, you purchase an end-user license agreement. An **end-user license agreement (EULA)** gives you the legal right to use the software under certain terms and conditions (Figure 14-21). Most license agreements state the software may not be used on more than one computer or by more than one user. Other license restrictions include copying the software, modifying it, or translating it to another language. These restrictions protect the rights of software developers, who do not want someone else to benefit unfairly from their work.



Please read the following License Agreement. Press the PAGE DOWN key to see the rest of the agreement.

Visible Systems Program License Agreement

CAREFULLY READ THIS LICENSE AGREEMENT BEFORE YOU INSTALL THE PROGRAM DISKETTES. BY INSTALLING THE SOFTWARE YOU INDICATE YOUR ACCEPTANCE OF THE TERMS AND CONDITIONS OF THIS AGREEMENT, AND YOUR AGREEMENT TO COMPLY FULLY WITH THEM. THIS SOFTWARE IS PROTECTED BY BOTH UNITED STATES COPYRIGHT LAW AND INTERNATIONAL COPYRIGHT TREATY PROVISIONS. THEREFORE, YOU MUST TREAT THIS SOFTWARE JUST LIKE A BOOK, EXCEPT THAT YOU MAY COPY IT ONTO A COMPUTER TO BE USED AND YOU MAY MAKE ARCHIVAL COPIES OF THE SOFTWARE FOR THE SOLE PURPOSE OF BACKING-UP OUR SOFTWARE AND PROTECTING YOUR INVESTMENT. YOU MUST REPRODUCE AND INCLUDE THE COPYRIGHT NOTICE ON THE BACKUP COPY.

Do you accept all the terms of the preceding License Agreement? If you choose No, Setup will close. To install Visible Analyst, you must accept this agreement.

Figure 14-21 When you install software, you must accept the terms of the end-user license agreement.

ISSUE

Software Piracy

Software Licenses and the Law

Software piracy occurs whenever a software program is installed, downloaded from the Internet or another computer, or copied without a proper license from the software manufacturer. If you purchase a license for a software program, you have the right to install that software on one computer and to make a backup copy for archival purposes. In the workplace, two types of software piracy exist: installing a single purchased copy onto several computers and making an extra copy to take home. Do you think this is a fair law? Why or why not? Do you think that software piracy within the workplace is a common practice? How can companies prevent software piracy?

For more information on software piracy, visit the Discovering Computers 2002 Issues Web page (**scsite.com/dc2002/issues.htm**) and click Chapter 14 Issue #3.

Design: Hardware Acquisition at Web Lane Café

Sadie and her team compile a requirements list for the database server. They prepare an RFP and submit it to 12 vendors: 8 through the Internet and 4 local computer stores. Ten vendors reply within the three-week deadline.

Of the 10 replies, the development team selects 2 to evaluate. They eliminate the other eight because these vendors did not offer adequate warranties for the database server. The project team members ask for benchmark test results for each server. In addition, they contact two current users of this database server for their opinions on its performance. After evaluating these two servers, the team selects the best one.

Sadie summarizes her team's findings in a report to the steering committee. The committee gives Sadie authorization to award a contract to the proposed vendor. As a courtesy and to maintain good working relationships, Sadie sends a letter to all 12 vendors informing them of their decision.

Detailed Design

Once you identify the data and process requirements, the next step is to develop detailed design specifications for the components in the proposed solution. A detailed design sometimes is called **physical design** because it specifies hardware and software for automated procedures. The activities to be performed include developing designs for the databases, inputs, outputs, and programs.

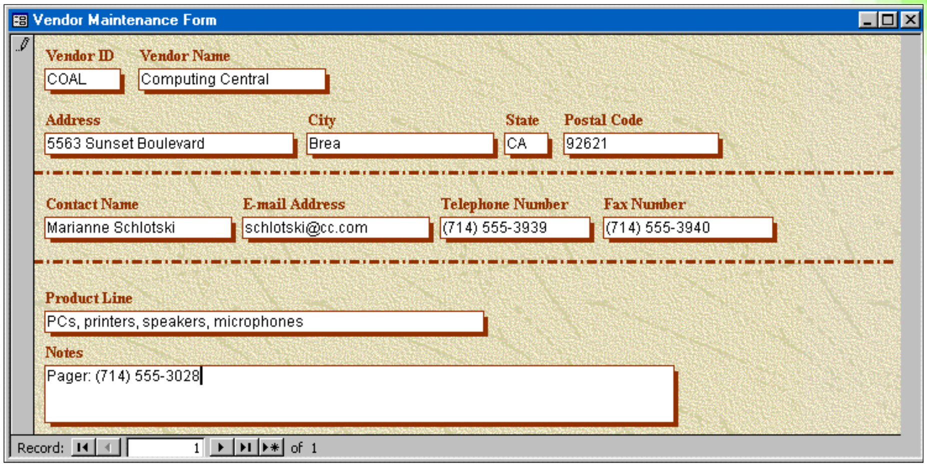
The length and complexity of these activities varies depending on previous decisions. For example, you would skip many of these activities when purchasing packaged software. If the company is developing custom software, however, these activities can be quite time consuming.

DATABASE DESIGN Data is one of the most valuable resources in an information system. Thus, it is crucial the content of the data dictionary be current, consistent, and correct. During database design, the systems analyst builds upon the data dictionary developed during the analysis phase. The dictionary should represent accurately the data requirements of the company. The systems analyst works closely with the database analysts and administrators to identify those data elements that currently exist within the company and those that are new.

With relational database systems, the systems analyst defines the structure of each table in the system, as well as relationships among the tables. The systems analyst also addresses user access privileges. This means the systems analyst defines which data elements each user can access, when they can access the data elements, what actions they can perform on the data elements, and under what circumstances they can access the elements. The systems analyst also considers the volume of database activity. For example, large, frequently accessed tables may be organized in a manner so that the database processes requests in an acceptable time frame.

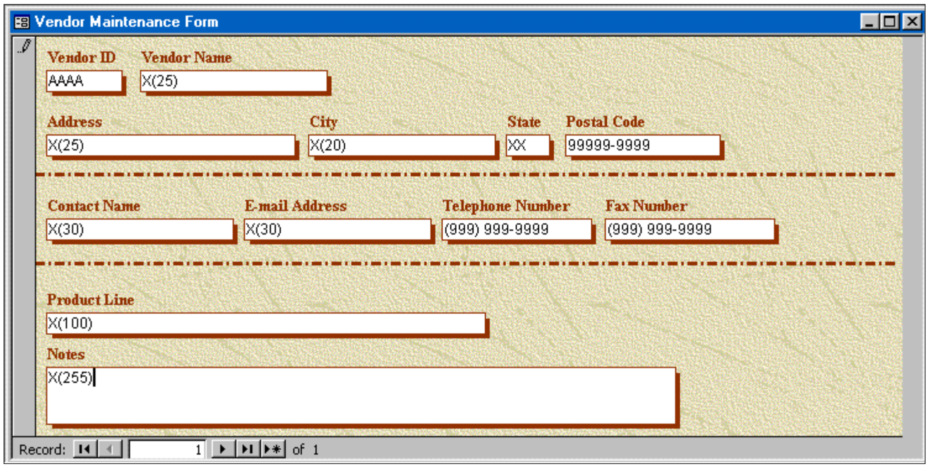
INPUT AND OUTPUT DESIGN Because users will work with the inputs and outputs of the system, it is crucial to involve users during input and output design. During this activity, the systems analyst carefully designs every menu, screen, and report specified in the requirements. The outputs usually are designed first because they help define the requirements for the inputs.

The systems analyst typically develops two types of designs for each input and output: a mockup and a layout chart. A **mockup** is a sample of the input or output that contains actual data (Figure 14-22). The systems analyst shows mockups to users for their approval. Once users approve the mockup, the systems analyst develops a **layout chart** for the programmer. Layout charts are more technical and contain programming-like notations for the data items (Figure 14-23). Other issues that must be addressed during input and output design include the types of media to use (paper, video, audio); formats (graphical or narrative); and data entry validation techniques, which include making sure the inputted data is correct (for example, a pay rate cannot be less than 0).



Vendor ID: COAL
Vendor Name: Computing Central
Address: 5563 Sunset Boulevard
City: Brea
State: CA
Postal Code: 92621
Contact Name: Marianne Schlotski
E-mail Address: schlotski@cc.com
Telephone Number: (714) 555-3939
Fax Number: (714) 555-3940
Product Line: PCs, printers, speakers, microphones
Notes: Pager: (714) 555-3028
Record: 1 of 1

Figure 14-22 Users must give their approval on all inputs and outputs. This input screen is a mockup (containing actual data) for the user to review.



Vendor ID: AAAA
Vendor Name: X(25)
Address: X(25)
City: X(20)
State: XX
Postal Code: 99999-9999
Contact Name: X(30)
E-mail Address: X(30)
Telephone Number: (999) 999-9999
Fax Number: (999) 999-9999
Product Line: X(100)
Notes: X(255)
Record: 1 of 1

Figure 14-23 Once users approve a mockup, the layout chart (with technical specifications) is given to the programmer. This layout chart is for the mockup in Figure 14-22.

PROGRAM DESIGN During program design, the systems analyst identifies the processing requirements, or the **logic**, for each program in the system. To do this the systems analyst uses top-down and structured programming techniques. The next chapter discusses these techniques.

Next, the systems analyst prepares the **program specification package**, which communicates program requirements clearly to the programmer. This package identifies the relationship among each program in a process, as well as the input, output, processing, and database specifications.

The systems analyst sometimes uses a **systems flowchart** to document relationships among programs in a process (Figure 14-24). A systems flowchart shows how other elements of the system interact with a major process. The elements include programs, inputs, outputs, and files. A systems flowchart is very different from a data flow diagram. A DFD shows the flow of data through the system. A system flowchart shows methods and procedures for the data.

Prototyping

Many systems analysts today use prototypes during detailed design. A **prototype** is a working model of the proposed system. The systems analyst actually builds a functional form of the solution during design. The main advantage of a prototype is users can work with the system before it is completed — to make sure it meets their needs.

The Vendor Maintenance Screen shown in Figure 14-23 on the previous page is a prototype. Once users approve a prototype, system developers can implement a solution more quickly than without a prototype. In many cases, prototyped systems do not require a programmer for implementation. The systems analyst can convert the working model to the actual solution. The process of developing applications with prototypes is a part of **rapid application development** (**RAD**). The next chapter discusses RAD.

Some systems analysts use prototyping during the design phase. Others begin earlier in the SDLC — during analysis or even planning. Beginning a prototype too early, however, might lead to problems. When the development team sees a working model so early in the SDLC, they tend to skip critical analysis and design steps and overlook key features in the proposed solution.

A common problem with prototypes is they have inadequate documentation, or worse, none at all. Prototyping can be an effective tool if the development team and the users discipline themselves to follow all activities within the SDLC. Prototyping should not eliminate or replace activities — just improve the quality of these activities.

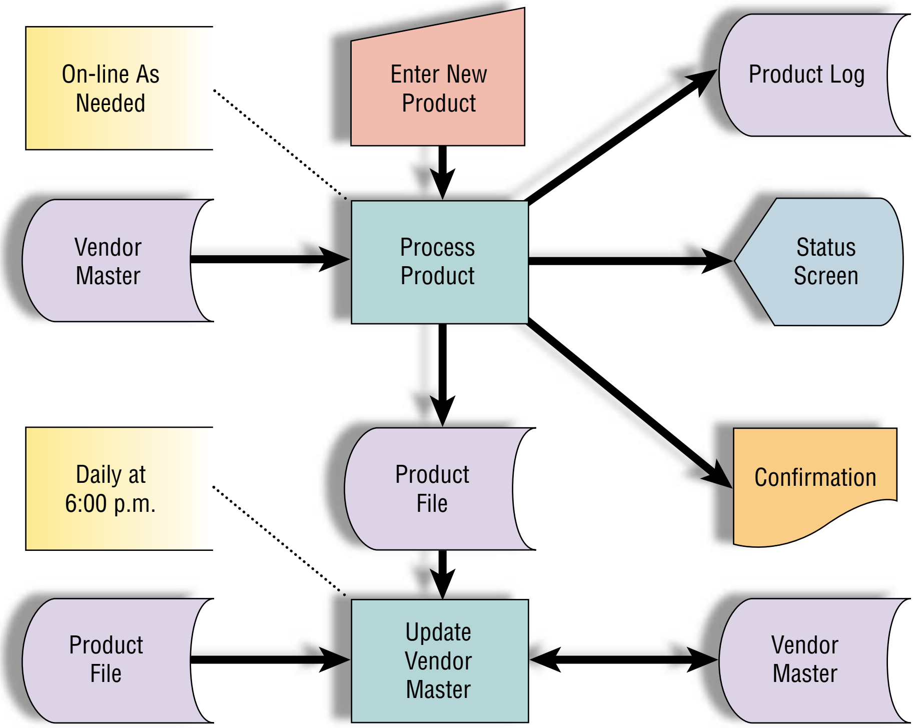


Figure 14-24 This systems flowchart describes the process of a transaction being entered such as entering a new product into the system. This chart contains six symbols, which are color coded so you can identify them: data entry, program, file, hard copy, comment, screen display. Comments are connected to the chart with dotted lines because they represent timing, not sequence.

CASE Tools

Many systems analysts use computer software to assist in the SDLC. **Computer-aided software engineering** (**CASE**) products are software tools designed to support one or more activities of the SDLC. The purpose of these products is to increase the efficiency and productivity of the project development team.

Some CASE tools exist separately. One package might be a dictionary and another allows you to create drawings. The most effective tools, however, are integrated (Figure 14-25). Integrated case products, sometimes called I-CASE or a CASE workbench include the following capabilities.

- Project repository – stores diagrams, specifications, descriptions, programs, and any other deliverable generated during the SDLC.
- Graphics – enables the drawing of diagrams, such as DFDs and ERDs.
- Prototyping – creates models of the proposed system.
- Quality assurance – analyzes deliverables, such as graphs and the data dictionary for accuracy.
- Code generators – create actual computer programs from design specifications.
- Housekeeping – establishes user accounts and provides backup and recovery functions.

CASE tools support a variety of SDLCs. Depending on the one your company uses, you can customize the CASE tools so all deliverables such as DFDs and ERDs use consistent terms.

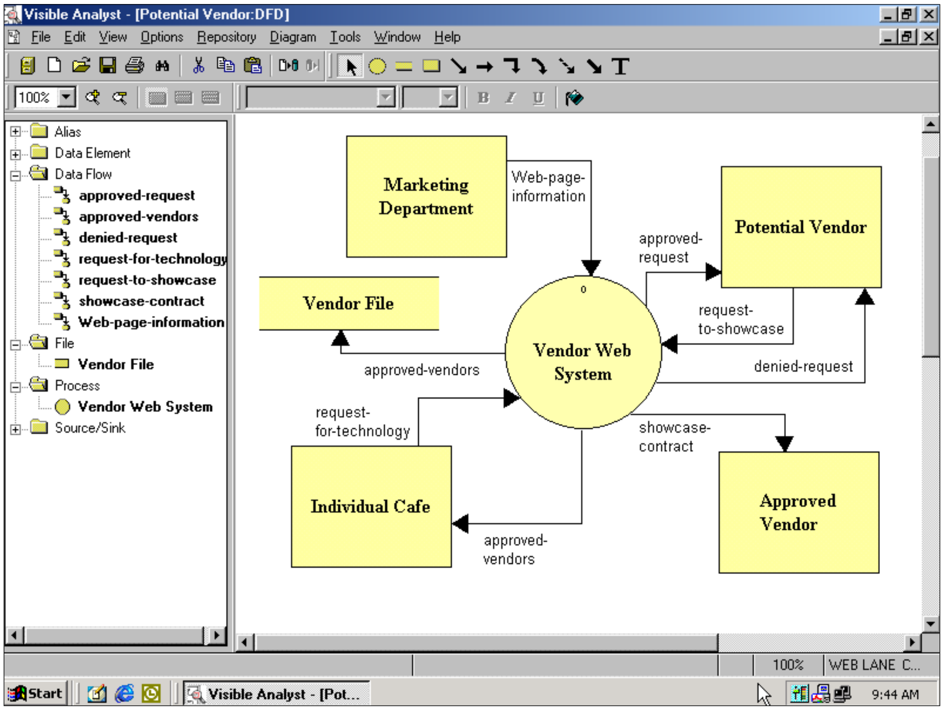


Figure 14-25 Integrated computer-aided software engineering (I-CASE) packages assist analysts in the development of an information system. Visible Analyst by Visible Systems Corporation enables analysts to create structured diagrams, as well as build the project dictionary. Figures 14-10 on page 14.16, 14-11 on page 14.17, and 14-15 on page 14.19 were created using Visible Analyst.

Web Link

For more information on CASE products, visit the Discovering Computers 2002 Chapter 14 WEB LINK page (**scsite.com/dc2002/ch14/weblink.htm**) and click CASE Products.

COMPANY ON THE CUTTING EDGE

Visible
SYSTEMS CORPORATION

Making a Case for CASE Tools

Donning night vision goggles and special clothing, National Guard members take their posts. Others climb into helicopters equipped with infrared devices and videotaping machines. These personnel are helping federal, state, and local law enforcement agencies intercept and eradicate illegal drugs in 54 states and territories.

As they plan, conduct, and evaluate their missions, they capture data on their activities and then enter these counterdrug facts and figures in a sophisticated information system developed with the Visible Systems Corporation's Visible Advantage™. This enterprise architecture and data warehouse development CASE (computer-aided software engineering) tool helps National Guard executives evaluate their activities and set thresholds for their future actions.

Another one of Visible Systems' popular software products is Visible Analyst®. This I-CASE tool provides graphical analysis and design resources for applications and database design. This software and other engineering tools help clients worldwide improve their processes and procedures, thus helping them become efficient and productive.

For more information on Visible, including case studies of actual projects, visit the Discovering Computers 2002 Companies Web page (**scsite.com/dc2002/companies.htm**) and click Visible Systems.

Quality Review Techniques

Several people should review the detailed design specifications before they are given to the programming team. The review process should include users, the senior systems analyst, and members of the project team.

One popular review technique is a structured walkthrough. A **structured walkthrough** is a step-by-step review of any SDLC deliverable. You can walk through items such as reports, diagrams, mockups, layout charts, and dictionary entries. The purpose of a walkthrough is to identify errors in the item being reviewed. If any errors are identified, the IT personnel must correct them. Developers use structured walkthroughs throughout the entire SDLC to review a variety of deliverables.

Once again, the systems analyst re-evaluates feasibility to determine if it still is beneficial to proceed with the proposed solution. It does not happen often, but companies cancel some projects at this point because they become infeasible. Although much time and money may have been spent, it is less costly to cancel the project than to proceed with an inadequate or incorrect solution. If the steering committee decides the project still is feasible, the project enters the implementation phase.

Detailed Design at Web Lane Café

As approved by the steering committee, Sadie and her team begin designing the Vendor Web System. After studying current vendor information and interviewing more users and vendors, the team designs changes to the company's database, Web site, and the associated programs. They prepare several documents including a mockup (see Figure 14-22 on page 14.27), a layout chart (see Figure 14-23 on page 14.27), and a systems flowchart (see Figure 14-24 on page 14.28).

After completing the detailed design, Sadie meets with several users and IT personnel to walk through the deliverables. They locate two errors. She corrects the errors and then presents the design to the steering committee. The committee agrees with the design solution and consents to implement it.

IMPLEMENTATION PHASE

Once you complete the design, the project enters the implementation phase. The purpose of the **implementation phase** is to construct, or build, the new or modified system and then deliver it to the users. System developers perform four major activities in this phase: (1) develop programs; (2) install and test the new system; (3) train users; and (4) convert to the new system. The following sections discuss each of these activities.

Develop Programs

If the company purchases packaged software, the development team skips this activity. For custom software, however, programmers write programs from the program specification package created during analysis. Just as the SDLC follows an organized set of activities, so does program development. These program development activities are known as the **program development life cycle** (**PDLC**).

The PDLC follows these six steps: (1) analyze the problem, (2) design the programs, (3) code the programs, (4) test the programs, (5) formalize the solution, and (6) maintain the programs. Chapter 15 explains the PDLC in depth. The important concept to understand now is that the PDLC is a part of the implementation phase, which is part of the SDLC.

Install and Test the New System

If the company acquires new hardware or software, someone must install and test it. It is extremely important the hardware and software be tested thoroughly. Obviously, you should test individual programs. You also should be sure all the programs work together in the system. It is better to find errors early in the process, so you can correct them before placing the system into production. You do not want errors in the system after you deliver it to the users.

System developers perform three types of tests:

- **Systems Test** – Verifies all programs in an application work together properly.
- **Integration Test** – Verifies an application works with other applications.
- **Acceptance Test** – Performed by end-users, checks that the new system works with actual data.

Train Users

For a system to be effective, users must be trained properly on its functionality. **Training** involves showing users exactly how they will use the new hardware and software in the system. This training could be one-on-one sessions or classroom-style lectures (Figure 14-26). Whichever technique you use, it should include hands-on sessions using realistic sample data. Users should practice on the actual system during training. Users also should receive user manuals for reference. It is the systems analyst's responsibility to create user manuals.

Figure 14-26 Organizations must ensure that users are trained properly on the new system. One training method is classroom-style lectures.

Convert to the New System

The final activity in implementation is to change from the old system to the new system. This change can take place using one or more of the following conversion strategies: direct, parallel, phased, or pilot (Figure 14-27).

With **direct conversion**, the user stops using the old system and begins using the new system on a certain date. The advantage of this strategy is it requires no transition costs and is a quick implementation technique. Some systems analysts call this technique an **abrupt cutover**. The disadvantage is it is extremely risky and can disrupt operations seriously if the new system does not work correctly the first time.

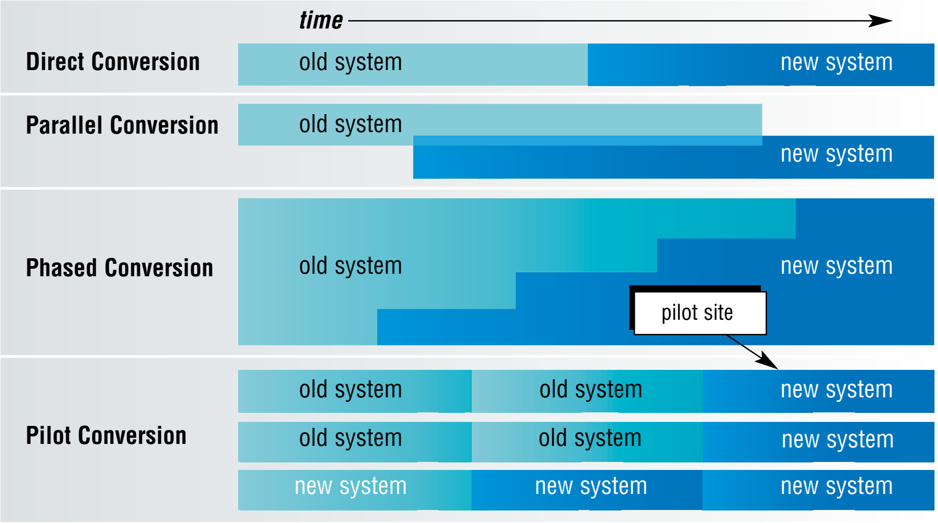


Figure 14-27 Converting from the old system to the new system usually follows one of these strategies.

ISSUE

Workers at Play

The Learning Curve and Employee Productivity

From 1950 to 1970, productivity — output per hour of work — increased almost three percent annually. Since that time, however, despite an expanding use of computer information systems, annual increases in productivity have been substantially less. Research indicates that during the last few years, growth was less than one percent. Economists are baffled. Some argue that information systems make the most positive impact where productivity is hard to measure, such as in finance and health care. Others suspect that advancing technology causes workers to spend more time learning new systems than the workers using systems to be more productive. Still others claim workers spend too much time on non-productive computer activities, such as surfing the Web or playing games. Which, if any, of these explanations do you think is correct? Why? What other reasons might there be? How can companies ensure that information systems will make their workers more productive?

For more information on worker productivity, visit the Discovering Computers 2002 Issues Web page (**scsite.com/dc2002/issues.htm**) and click Chapter 14 Issue #4.

Parallel conversion consists of running the old system alongside the new system for a specified time period. Results from both systems are compared. If the results are the same, the company either terminates the old system abruptly or phases it out. The advantage of this strategy is that you can fix any problems in the new system before you terminate the old system. The disadvantage is it is costly to operate two systems at the same time.

Larger systems that have multiple sites often use a phased conversion. With a **phased conversion**, or **location conversion**, each site converts at a separate time. For example, an accounting system might convert accounts receivable, accounts payable, general ledger, and payroll sites in separate phases. Each site can use a direct or parallel conversion.

With a **pilot conversion**, only one location in the company uses the new system — so it can be tested. Once the pilot site approves the new system, other sites convert using one of the other conversion strategies.

At the beginning of the conversion, existing data must be made ready for the new system. Converting existing manual and computer files so the new system can use them is known as **data conversion**.

Implementation at Web Lane Café

Upon receiving the program specification package, Sadie forms an implementation team of Jesse Martinez, Webmaster; Andrea Travnik, programmer; and Kelly Sarkis, data modeler. The implementation team works together to implement the Vendor Web System.

Sadie works closely with the team to answer questions about the design and to check the progress of their work. When the team completes its work, they ask Sadie to test it. She does and it works great!

Sadie arranges a training class for the employees of the marketing and customer service departments. During the training session, she shows them how to use the new Vendor Information page on the company's Web site. Sadie gives each attendee a user guide. She wants to prepare everyone thoroughly for the new Web pages once they are posted. Sadie also sends a letter to all existing vendors informing when this new service will be available and how to use it.

SUPPORT PHASE

The purpose of the **support phase** is to provide ongoing assistance for an information system and its users after the system is implemented. The support phase consists of four major activities: (1) conduct a post-implementation system review, (2) identify errors, (3) identify enhancements, and (4) monitor system performance.

One of the first activities the company performs in the support phase is to meet with users. The purpose of this meeting, called the **post-implementation system review**, is to find out if the information system is performing according to the users' expectations. If it is not, you must determine what must be done to satisfy the users — back to the planning phase.

Sometimes users identify errors in the system when the program does not produce correct results. Problems with design (logic) or programming (syntax) are the cause of these errors.

TECHNOLOGY TRAILBLAZER

TOM **DEMARCO**

Ever wonder why software is so expensive? Tom DeMarco knows why. As author of *Why Does Software Cost So Much? (And Other Puzzles of the Information Age)*, he has explored the successes and the absurdities of the software development process. In more than 100 books, articles, and papers, DeMarco focuses on productive business principles for project management.

He is a principal for The Atlantic Systems Guild, Inc., a software think tank exploring issues facing the computer industry. DeMarco's efforts center on software specification and design, software metrics, people-aware project management, and risk management. He believes that good managers focus on motivating employees and designing organizations to work efficiently; they do not pressure their employees to produce under extreme deadlines. In contrast, poor managers exert pressure because they know of no other solution. Project managers should apply the principles they learned in kindergarten — tell the truth and work together — as behavior guidelines.

For more information on Tom DeMarco, visit the Discovering Computers 2002 People Web page (**scsite.com/dc2002/people.htm**) and click Tom DeMarco.

Often these errors are minor. For example, the total of a column might be incorrect on a daily order summary. Other times, however, the error requires more serious investigation — back to the planning phase.

In some cases, users would like the system to do more. Maybe they have additional requirements. **System enhancement** involves modifying or expanding an existing application system — back to the planning phase.

During the support phase, the systems analyst monitors performance of the new or modified information system. The purpose of **performance monitoring** is to determine if the system is inefficient at any point. If so, is the inefficiency causing a problem? Is the time it takes to download vendor information reasonable? If not, the systems analyst must investigate solutions to make the download time more acceptable — back to the planning phase.

Support at Web Lane Café

During the post-implementation system review, Sadie learns many hits have been made to the new Web page. Vendors are using it and they like it! Customer service regularly receives e-mail messages from vendors that appreciate the new service. Carla says her staff has much more time to spend on other tasks.

Six months after the Vendor Web System has been in operation, Carla would like to add more information to the Vendor Information page. She sends an e-mail message to Sadie requesting the change. Sadie asks her to fill out a Request for System Services and puts her on the agenda of the next steering committee meeting. Back to the planning phase again!

CHAPTER SUMMARY

This chapter discussed the phases in the system development life cycle. The guidelines for system development also were presented. The chapter addressed activities that occur during the entire SDLC such as project management, feasibility assessment, data and information gathering, and documentation. Throughout the chapter, a case study about Web Lane Café illustrated and reinforced activities performed during each phase of the life cycle.

ISSUE

Everyone Is Complaining

Costly System Errors

Eighteen months after a $5 million information system was placed in full operation, workers for a New York county were grumbling that the system was plagued with errors. The head of the county's Civil Service Employees Association reported complaints from almost every department. The cost of remedying the flawed system was prohibitive, and county legislators were incensed. During system development, problems are easier and less expensive to fix at some phases in the system development life cycle than at others. When would it be simplest and least costly to identify and solve problems? Why? At what phase would it be more expensive? Why? If you were the project leader, how would your beliefs influence the way you manage each phase of the SDLC?

For more information on the SDLC, visit the Discovering Computers 2002 Issues Web page (**scsite.com/dc2002/issues.htm**) and click Chapter 14 Issue #5.

Systems Analyst

One of the most in-demand IT positions is that of systems analyst. The primary nature of this type of work is to design and develop new hardware and software systems and to incorporate new technologies.

To be successful as a systems analyst, you must be willing to embrace new technologies and be prepared for continual learning. Typically, systems analysts are more involved in design issues than in day-to-day coding. Systems analyst is a somewhat arbitrary title, however, as different companies define the role differently. Some emerging paradigms for the systems analyst include e-commerce, enterprise-wide networking, and intranet technologies. Given the technology available today, telecommuting is common for computer professionals, including the systems analyst. Many analysts work as consultants.

Minimum educational requirements are a bachelor's degree, but many people opt for a masters. Because this is one of the top three fastest growing occupations in the IT field, salaries are excellent. They range from $40,000 to $80,000 and up. Recent reports indicate graduates are receiving offers in excess of $50,000 per year.

To learn more about the field of systems analyst as a career, visit the Discovering Computers 2002 Careers Web page (**scsite.com/dc2002/careers.htm**) and click Systems Analyst.

E-RESEARCH

SEARCH AND YE SHALL FIND

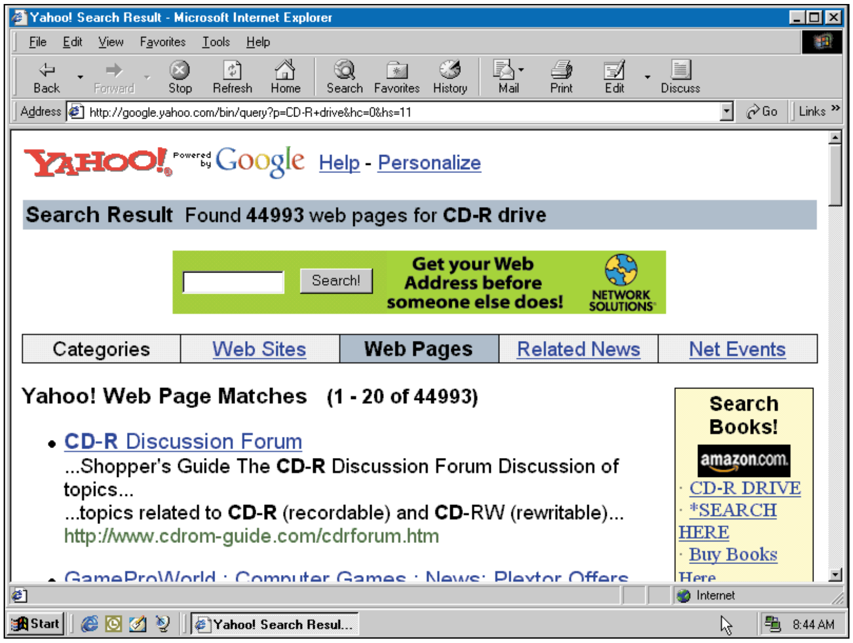
Info on the Web

Have you ever wondered which Beatles albums turned platinum? What is the manufacturer's suggested retail price of a 2002-model Corvette? How low is the lowest price for a new CD-ROM for your computer? These facts and figures are at your fingertips — if you know where to locate them on the Internet.

Unlike the days when you used the Dewey Decimal Classification or the Library of Congress systems to locate reference materials easily, you will not find Internet documents organized in any systematic manner. And no helpful, patient reference librarian is working behind a desk to assist you in your quest for information. Instead, you are on your own when you navigate the tangled Web. But you have some tools: search engines and subject directories.

Yahoo!, AltaVista, Go.com, Northern Light, Excite, FAST Search, and Google are some of the more popular search engines. They crawl through a Web page, and with the help of programs such as spiders and robots, they record each word in their enormous databases. When you enter a key term, search text, or query, in their search boxes, the search engines scan the databases and list the Web sites that contain the specified search text. As shown in Figure 14-28, the Yahoo! search result for the phrase, CD-R drive, lists nearly 45,000 Web sites.

The key to effective searching on the Web is composing search queries that narrow the search results and place the most relevant Web sites at the top of the list. Think of major terms that describe the issue or item you are researching and use Boolean operators — and, or, and not — to help retrieve appropriate Web sites. The Go.com search locates Web sites describing the Beatles' platinum albums and eliminates Web sites describing platinum jewelry or Beatles' memorabilia, as shown in Figure 14-29.



http://google.yahoo.com/bin/query?p=CD-R+drive&hc=0&hs=11

Help - Personalize

Search Result Found **44993** web pages for **CD-R drive**

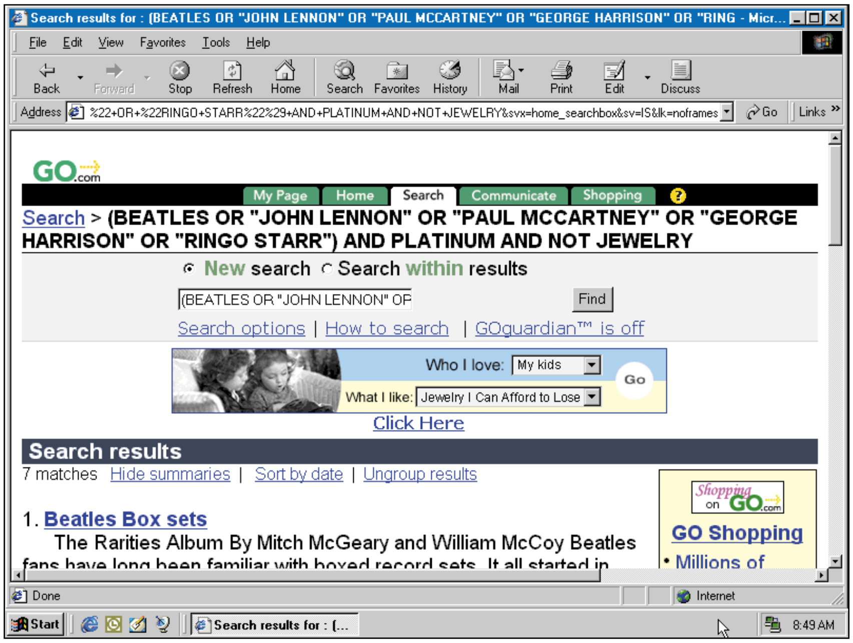
Categories | Web Sites | **Web Pages** | Related News | Net Events

Yahoo! Web Page Matches (1 - 20 of 44993)

- CD-R Discussion Forum
  ...Shopper's Guide The **CD-R** Discussion Forum Discussion of topics...
  ...topics related to **CD-R** (recordable) and **CD**-RW (rewritable)...
  http://www.cdrom-guide.com/cdrforum.htm
- GameProWorld : Computer Games : News: Plextor Offers

· CD-R DRIVE
· *SEARCH HERE
· Buy Books Here

Figure 14-28 Yahoo! features organized information on tens of thousands of computers linked to the Internet.



%22+OR+%22RINGO+STARR%22%29+AND+PLATINUM+AND+NOT+JEWELRY&svx=home_searchbox&sv=IS&lk=noframes

Search > **(BEATLES OR "JOHN LENNON" OR "PAUL MCCARTNEY" OR "GEORGE HARRISON" OR "RINGO STARR") AND PLATINUM AND NOT JEWELRY**

● New search ○ Search within results

(BEATLES OR "JOHN LENNON" OF

Search options | How to search | GOguardian™ is off

Who I love: My kids
What I like: Jewelry I Can Afford to Lose

Click Here

Search results

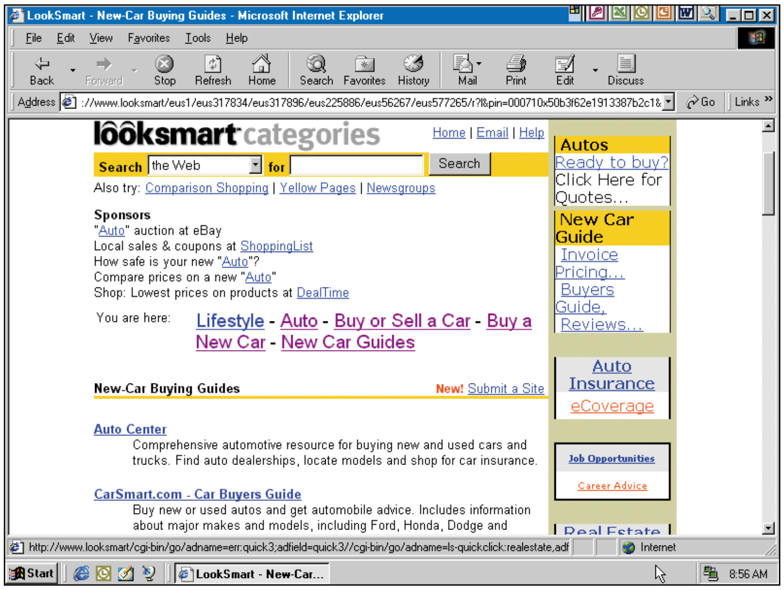
7 matches Hide summaries | Sort by date | Ungroup results

1. **Beatles Box sets**
   The Rarities Album By Mitch McGeary and William McCoy Beatles fans have long been familiar with boxed record sets. It all started in

GO Shopping

- Millions of

Figure 14-29 The Walt Disney Company's Go.com Web site features seearches, shopping, and news.



://www.looksmart/eus1/eus317834/eus317896/eus225886/eus56267/eus577265/r?l&pin=000710x50b3f62e1913387b2c1&

lôôksmart categories

Home | Email | Help

Search the Web for Search

Also try: Comparison Shopping | Yellow Pages | Newsgroups

Sponsors
"Auto" auction at eBay
Local sales & coupons at ShoppingList
How safe is your new "Auto"?
Compare prices on a new "Auto"
Shop: Lowest prices on products at DealTime

You are here: Lifestyle - Auto - Buy or Sell a Car - Buy a New Car - New Car Guides

New-Car Buying Guides New! Submit a Site

Auto Center
Comprehensive automotive resource for buying new and used cars and trucks. Find auto dealerships, locate models and shop for car insurance.

CarSmart.com - Car Buyers Guide
Buy new or used autos and get automobile advice. Includes information about major makes and models, including Ford, Honda, Dodge and

Autos
Ready to buy? Click Here for Quotes...

New Car Guide
Invoice Pricing... Buyers Guide, Reviews...

Auto Insurance
eCoverage

Job Opportunities
Career Advice

Real Estate

http://www.looksmart/cgi-bin/go/adname=err:quick3;adfield=quick3//cgi-bin/go/adname=ls-quickclick:realestate,adf

Figure 14-30 Webrarians index millions of Web pages into more than 200,000 categories.

RESEARCH WEB SITES	URL
Search Engines	
Yahoo!	yahoo.com
AltaVista	altavista.com
Go.com	go.com
Northern Light	northernlight.com
Excite	excite.com
FAST Search	fastsearch.com
Google	google.com
Subject Directories	
Yahoo!	yahoo.com
LookSmart	looksmart.com
About	about.com
Argus Clearinghouse	clearinghouse.net
The Internet Public Library	ipl.org
The WWW Virtual Library	vlib.org

For an updated list of research Web sites, visit scsite.com/dc2002/e-rev.htm.

Figure 14-31 Web users can find information by using search engines and subject directories.

For example, searching on Beatles, or John Lennon, or Paul McCartney, or George Harrison, or Ringo Starr, along with platinum and not jewelry can help you narrow the list of results.

Even when using these search techniques, one search engine only can explore 20 percent of the 200 million Internet pages. All the search engines combined can rummage through less than half of these Web sites.

Another search tool is a subject directory, which is a collection of related Web sites. Yahoo! and LookSmart have two of the most comprehensive subject directories on the Web. Their organized lists often are called trees because a few main categories, such as Entertainment, Computing, Lifestyle, and Work, branch out to more specific subtopics. Figure 14-30 shows LookSmart's tree for buying a new car. The list begins with the Lifestyle main category and branches to Auto, Buy or Sell a Car, Buy a New Car, and finally New Car Guides.

For more information on searching on the Web and for an updated list of research Web sites, visit the Discovering Computers 2002 e-Revolution Web page (scsite.com/dc2002/e-rev.htm) and click Research.

eREVOLUTION E-RESEARCH *applied:*

1. This chapter discusses acquiring hardware and software during the design phase of the Systems Development Life Cycle and displays Sony's and Approved Systems' Web sites. Use two of the search engines listed in Figure 14-31 to find three Web sites reviewing the latest digital cameras from Sony and Kodak. Make a table listing the search engines, Web site names, and the cameras' model numbers, suggested retail price, megapixels, memory, and features.

2. If money were no object, virtually everyone would have an exquisite car. On the other hand, drivers need a practical vehicle to drive around town daily. Use one of the subject directories listed in Figure 14-31 to research your dream car and another directory to research your practical car. Write a paragraph about each car describing the particular subject directory tree you used, the MSRP of the car, standard and optional equipment, engine size, miles per gallon, and safety features.

In Summary

Web Instructions: To display this page from the Web, start your browser and enter the URL scsite.com/dc2002/ch14/summary.htm. Click the links for current and additional information. To listen to an audio version of this In Summary, click the Audio button. To play the audio, RealPlayer must be installed on your computer (download by clicking here).

1 Describe the Phases in the System Development Life Cycle.

The system development life cycle (SDLC) is an organized set of activities that guides those involved through the development of an information system and to maintain and monitor ongoing activities. The activities of the SDLC are grouped into five **phases**, some of which are performed concurrently and others sequentially. The **planning phase** involves reviewing and prioritizing project requests, allocating resources, and identifying the project development team. The **analysis phase** consists of conducting a preliminary investigation and performing detailed analysis activities. The **design phase** calls for acquiring the necessary hardware and software and developing details of the system. The **implementation phase** includes developing programs, installing and testing the new system, training and educating users, and converting to the new system. The **support phase** entails conducting post-implementation system review, identifying errors and enhancements, and monitoring system performance.

2 What Are the Guidelines for System Development?

The development of an information system should follow three general guidelines. First, use a phased approach to group activities or tasks. Second, involve the **users**, including anyone for whom the system is being built. Third, develop standards, or sets of rules and procedures, that the organization expects employees to accept and follow.

3 What Are Some of the Responsibilities of IT Professionals?

IT professionals with whom the system analyst might work include other analysts; database analysts and administrating users, who submit requests for change; a **steering committee**, which is responsible for decision making; programmers; network administrators; vendors; Webmaster; and managers.

4 Why Are Project Management, Feasibility Assessment, Data and Information Gathering Techniques, and Documentation Important?

Project management is the process of planning, scheduling, and then controlling the activities during the SDLC. The goal is to deliver an acceptable system in an agreed-upon time frame, while maintaining costs. The project plan generally is recorded and monitored using a **Gantt chart** and **project management software**. **Feasibility** is a measure of how suitable the development of a system will be to an organization. Analysts use four criteria to test feasibility: **operational feasibility**, **schedule feasibility**, **technical feasibility**, and **economic feasibility**. Data and information gathering techniques supply system developers with accurate and timely data in order to keep the project on schedule, assess feasibility, and ensure that the system is meeting requirements. **Documentation** is the compilation and summarization of data and information.

In Summary

5 How Are Structured Tools such as Entity-Relationship Diagrams and Data Flow Diagrams Used in Analysis and Design?

A system analyst uses graphics to present a systems analysis in a way that can be understood by the project team. An **entity-relationship diagram** (**ERD**) is a tool that graphically represents the associations between entities (vendors, orders, customers, jobs, and so on) in the project. A data flow diagram (DFD) is a tool that graphically represents the flow of data (input or output of data or information) in a system.

6 What is the Difference between Packaged Software and Custom Software?

When a steering committee discusses the **system proposal** and determines which alternative to implement, it often faces a build-or-buy decision. The committee must decide whether to buy packaged software or build custom software. **Packaged software** is pre-written software available for purchase. Custom software is application software developed by the user or at the user's request. Custom software matches an organization's requirements but usually is more expensive than packaged software and takes longer to design and implement.

7 How Is Program Development Part of the System Development Life Cycle?

If the project development team decides to write custom software, then programmers develop programs from the program specification package created during analysis. The **program development life cycle** (**PDLC**) is part of the implementation phase of the SDLC and follows an organized set of six activities. These six steps are: (1) analyze the problem, (2) design the programs, (3) code the programs, (4) test the programs, (5) formalize the solution, and (6) maintain the programs.

8 What Techniques Are Used to Convert to a New System?

The final activity in implementation is to change from the old system to the new system. This is called conversion. Moving to a new system can take place using one or more strategies. With **direct conversion**, the user stops using the old system and begins using the new system on a certain date. **Parallel conversion** consists of running the old system alongside the new system for a specified period of time. Phased conversion is used with larger systems that are split into individual sites, each of which converts separately at different times using either a direct or parallel conversion. With a **pilot conversion**, only one location in the organization uses the new system — so it can be tested.

9 How Do IT Professionals Support an Information System?

In the **support phase**, systems analysts perform four major activities. They conduct a post-implementation system review, which is a meeting with users to determine if the information system is performing according to their specifications. Second, they identify errors. Third, they identify **system enhancements**. Finally, they do performance monitoring to determine if the system is inefficient at any point.

INFOWORLD.COM - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://www.infoworld.com/
Go Links
The ITworld.com Network
Network Search Sites Services ITcareers
POWERED BY LOTUS NOTES AND DOMINO RUNNING ON IBM NETFINITY SERVERS.
Reliable access. Enhanced services. Satisfied customers.
Account Access
Lotus. An IBM Company
Advertise with InfoWorld
IDG.net
SUBSCRIBE HOME
News Test Center Opinions Forums Careers Stock Quote Subject Indexes About Us Search
Search
SITEMAP
INFO WORLD .COM
Oct. 9
Sign up for our Newsletters Forums & To Go editions
Top Stories
CTOZONE
CTO OF THE YEAR
CTO RESEARCH
CTO SPOTLIGHT
E-BUSINESS TREND WATCH
E-BUSINESS ENABLERS
FEATURES
News
Research Tools
Test Center
Test Center Analysis
Done
Internet
Start
INFOWORLD.COM - Mic...
9:44 AM

Big guns rattle ASP battlefield
OCTOBER 6, 1:01 PM PT

EU to rule on AOL-Time Warner deal Wednesda
TODAY, 6:37 AM PT

Online merchants gird for credit card fraud
OCTOBER 6, 1:01 PM PT

Tying together far-flung networks
OCTOBER 6, 1:01 PM PT

Committee approves watered-down anti-hacker bill
House ponders cybercrimes
OCTOBER 6, 4:33 PM PT

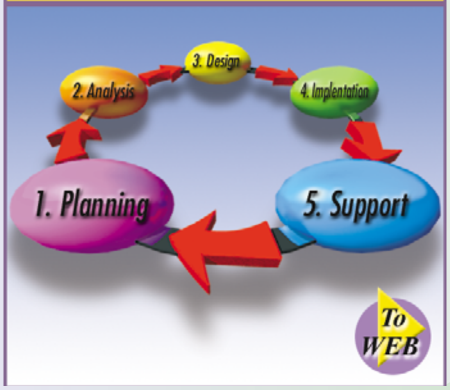
Key Terms

Web Instructions: To display this page from the Web, start your browser and enter the URL scsite.com/dc2002/ch14/terms.htm. Scroll through the list of terms. Click a term to display its definition and a picture. Click the To WEB button for current and additional information about the term from the Web. To see animations, Shockwave and Flash Player must be installed on your computer (download by clicking here).

abrupt cutover (14.31)
acceptance test (14.30)
agent (14.17)
analysis phase (14.13)
benchmark test (14.25)
commercial off-the-shelf software (14.19)
computer-aided software engineering (CASE) (14.29)
context diagram (14.17)
cost/benefit feasibility (14.7)
custom software (14.20)
cybercafé (14.11)
data conversion (14.32)
data dictionary (14.19)
data flow (14.17)
data flow diagram (DFD) (14.17)
data store (14.17)
decision table (14.18)
decision tree (14.18)
deliverable (14.6)
design phase (14.21)
detailed analysis (14.15)
direct conversion (14.31)
documentation (14.7)
economic feasibility (14.7)
electronic magazine (14.22)
end-user license agreement (EULA) (14.26)
entity (14.16)
entity-relationship diagram (E-R diagram or ERD) (14.16)
e-zine (14.22)
feasibility (14.6)
feasibility study (14.13)
Gantt chart (14.5)
horizontal market software (14.20)
implementation phase (14.30)
information system (IS) (14.2)
integration test (14.30)
joint-application design (JAD) session (14.8)
layout chart (14.27)
location conversion (14.32)
logic (14.28)
logical design (14.15)
mockup (14.27)
operational feasibility (14.6)
packaged software (14.19)
parallel conversion (14.32)
performance monitoring (14.33)
phased conversion (14.32)
phases (14.2)
physical design (14.26)
pilot conversion (14.32)
planning phase (14.12)
post-implementation system review (14.32)
preliminary investigation (14.13)
process (14.17)
program development life cycle (PDLC) (14.30)
program specification package (14.28)
project dictionary (14.17)
project leader (14.5)
project management (14.5)
project management software (14.6)
project notebook (14.7)
project plan (14.5)
project request (14.10)
project team (14.5)
prototype (14.28)
rapid application development (RAD) (14.28)
repository (14.17)
request for information (RFI) (14.23)
request for proposal (RFP) (14.23)
request for quotation (RFQ) (14.22)
request for system services (14.10)
schedule feasibility (14.6)
scope (14.5)
software engineering (14.2)
source (14.17)
standards (14.4)
steering committee (14.5)
structured analysis and design (14.15)
structured English (14.18)
structured walkthrough (14.30)
support phase (14.32)
system (14.2)
system development life cycle (SDLC) (14.2)
system enhancement (14.33)
system proposal (14.19)
systems analyst (14.5)
systems flowchart (14.28)
systems test (14.30)
technical feasibility (14.7)
trade publication (14.20)
training (14.30)
turnkey solution (14.24)
users (14.3)
value-added reseller (VAR) (14.23)
vertical market software (14.20)
warranty (14.23)

SYSTEM DEVELOPMENT LIFE CYCLE (SDLC)

Organized set of activities that guides those involved through the development of an information system. The phases in the SDLC are planning, analysis, design, implentation, and support. (14.2)



Learn It Online

Web Instructions: To display this page from the Web, start your browser and enter the URL scsite.com/dc2002/ch14/learn.htm.

1. Web Guide

Click Web Guide to display the Guide to World Wide Web Sites and Searching Techniques page. Click Reference and then click Webopedia. Search for CASE. Click one of the CASE links. Use your word processing program to prepare a brief report on your findings and submit your assignment to your instructor.

2. Scavenger Hunt

Click Scavenger Hunt. Print a copy of the Scavenger Hunt page; use this page to write down your answers as you search the Web. Submit your completed page to your instructor.

3. Who Wants to Be a Computer Genius?

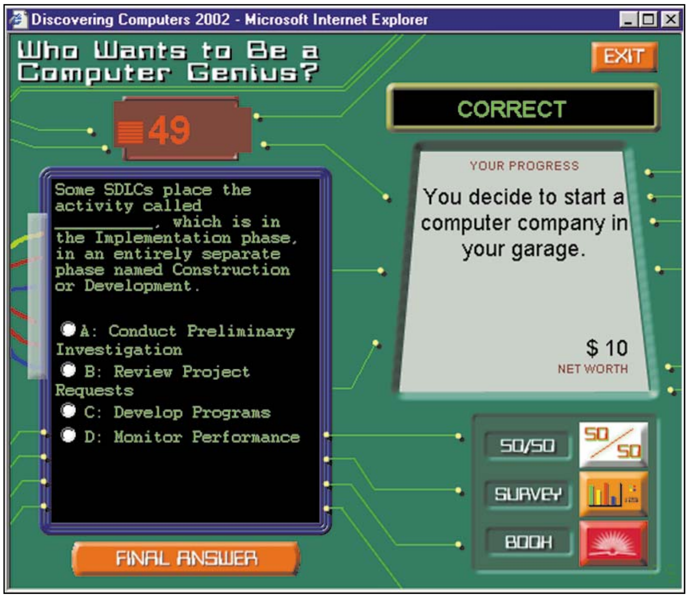
Click Computer Genius to find out if you are a computer genius. Directions on how to play the game will display. When you are ready to play, click the PLAY button. Submit your score to your instructor.

4. Wheel of Terms

Click Wheel of Terms to reinforce important terms you learned in this chapter by playing the Shelly Cashman Series version of this popular game. Directions on how to play the game will display. When you are ready to play, click the PLAY button. Submit your score to your instructor.

5. Career Corner

Click Career Corner to display the WomenCentral page. Click one of the search results links and then review the information. Write a brief report describing what you learned. Submit the report to your instructor.


Discovering Computers 2002 - Microsoft Internet Explorer
Who Wants to Be a Computer Genius?
EXIT
CORRECT
49
50/50
SURVEY
BOOK
FINAL ANSWER

Some SDLCs place the activity called ________, which is in the Implementation phase, in an entirely separate phase named Construction or Development.

● A: Conduct Preliminary Investigation
● B: Review Project Requests
● C: Develop Programs
● D: Monitor Performance

YOUR PROGRESS

You decide to start a computer company in your garage.

$ 10
NET WORTH

6. Search Sleuth

Click Search Sleuth to learn search techniques that will help make you a research expert. Submit the completed assignment to your instructor.

7. Crossword Puzzle Challenge

Click Crossword Puzzle Challenge. Complete the puzzle to reinforce skills you learned in this chapter. Directions on how to play the game will display. When you are ready to play, click the PLAY button. Submit the completed puzzle to your instructor.

8. Practice Test

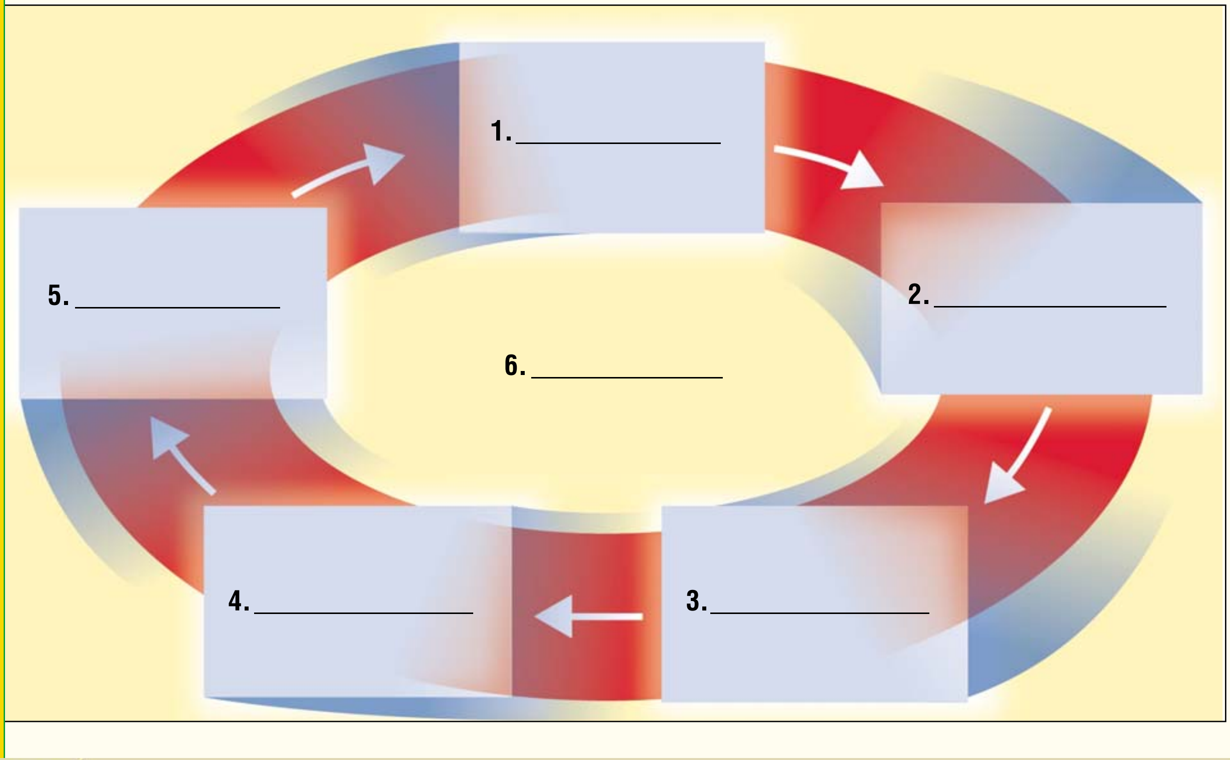
Click Practice Test. Answer each question. When completed, enter your name and click the Grade Test button to submit the quiz for grading. Make a note of any missed questions. If required, print a copy to submit to your instructor.

Checkpoint

Web Instructions: To display this page from the Web, start your browser and enter the URL scsite.com/dc2002/ch14/check.htm. Click the links for current and additional information. To experience the animation and interactivity, Shockwave and Flash Player must be installed on your computer (download by clicking here).

LABEL THE FIGURE

Instructions: Identify the phases in the system development life cycle.



MATCHING

Instructions: Match each term from the column on the left with the best description from the column on the right.

_______ 1. benchmark test
_______ 2. data dictionary
_______ 3. direct conversion
_______ 4. pilot conversion
_______ 5. systems analyst

a. Only one location in the company uses the new system.
b. Measures the performance of hardware or software.
c. Contains data about each file in the database.
d. Manages and controls the budget and schedule of the project.
e. User stops using the old system and begins using the new system on a certain date.
f. Responsible for designing and developing an information system.
g. Running the old system alongside the new system for a specified period of time.

Checkpoint

MULTIPLE CHOICE

Instructions: Select the letter of the correct answer for each of the following questions.

1. A(n) ___________ supports daily, short-term, and long-range activities of users.
   a. information system
   b. systems analyst
   c. project manager
   d. conversion specialist
2. ___________ is the third phase of the SDLC.
   a. Implementation
   b. Support
   c. Design
   d. Planning
3. Sets of rules and procedures that a company expects employees to follow are called ___________ .
   a. proposal
   b. solutions
   c. standards
   d. guidelines
4. A ___________ uses horizontal bars to show project phases or activities.
   a. timeline
   b. planning guide
   c. project guide
   d. Gantt Chart
5. In a(n) ___________ , a vendor quotes a price for the listed product(s).
   a. RFQ
   b. RFP
   c. BID
   d. RFI

SHORT ANSWER

Instructions: Write a brief answer to each of the following questions.

1. What is a project plan? ___________ How is a Gantt chart used within a project plan? ___________
2. What is feasibility? ___________ List and briefly describe the four tests a system analyst uses to evaluate feasibility. ___________
3. What is JAD? ___________ How would a system analyst use JAD? ___________
4. What are the two structured analysis graphical design tools? ___________ How are they different? ___________
5. What is a data dictionary? ___________ How does a systems analyst use a data dictionary? ___________

WORKING TOGETHER

Instructions: Working with a group of your classmates, complete the following team exercise.

Identify a problem on campus or a common problem within your community. One or two individuals assume the position of system analyst. The remaining students assume the role of one of the people identified in Chapter 14 in Figure 14.3 on page 14.4. Some students are users and others are members of the project team. Brainstorm and determine a feasible solution for the problem. Using a software program such as Microsoft Project, design a plan and a schedule for implementing your solution. To learn more about project management, use your browser to link to scsite.com/dc2002/ch14/check.htm.

Web Instructions: To display this page from the Web, start your browser and enter the URL scsite.com/dc2002/ch14/lab.htm. Click the links for current and additional information.

Traffic Sign Tutorial

1

Insert the Discover Data Disk into drive A. See the inside back cover of this book for instructions for downloading the Discover Data Disk or see your instructor for information on accessing the files required in this book. Click the Start button on the taskbar and then click Run on the Start menu. In the Open text box, type `a:traffic.exe` and then press the ENTER key to display the Traffic Sign Tutorial window. This program was written in Visual Basic. Drag the signs to their correct containers. Click Options on the menu bar and then click Clear to reset the tutorial. Click Options on the menu bar and then click Show. Click Options on the menu bar and then click Clear. Click Options on the menu bar and then click Quiz. Answer the quiz questions.

Dr. Watson

2

This exercise uses Windows 98 or Windows 2000 procedures. Dr. Watson is a Windows diagnostic tool used to identify faults in a system. To find out more about Dr. Watson, click the Start button on the taskbar and then click Help on the Start menu. Click the Index tab. Type `Dr. Watson` in the Type in the keyword to find text box and then click the Display button. Click an appropriate Help topic in the Topics Found dialog box, click the Display button, and answer the following questions:

- How is Dr. Watson used to diagnose system faults?
- How can you open Dr. Watson from the Start menu?
- How do you use Dr. Watson to create a system snapshot?

Click the Close button to close the Windows Help window.

Creating a Drawing

3

Click the Start button on the taskbar, point to Programs on the Start menu, point to Accessories on the Programs submenu, and then click Paint on the Accessories submenu. If necessary, maximize the Paint window and drag the lower-right corner of the white rectangle to the right to increase its size. Change the background color to orange by clicking the color orange in the color box at the bottom of the Paint window, clicking the Fill With Color tool (row 2, column 2) in the toolbox on the left edge of the window, and clicking the white rectangle. Change the foreground color to red by clicking the color red in the color box. Use the Rectangle tool (row 7, column 1) and the Line tool (row 6, column 1) in the toolbox to draw the box (Figure 14-32). Use the Fill With Color tool (row 2, column 2) in the toolbox and color box to color the box. If you make a mistake, click Edit on the menu bar and then click Undo to erase your last draw. Click File on the menu bar and then click Save. With a floppy disk in drive A, type `a:\h14-3` in the File name text box. Click the Save button. Click File on the menu bar and then click Print. Click the OK button. Close the Paint window.

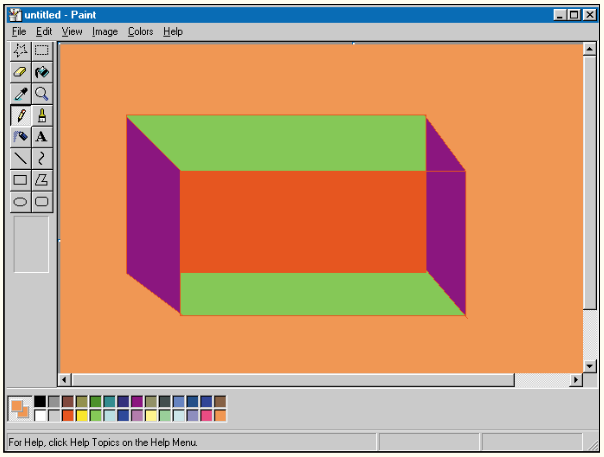

untitled - Paint
File Edit View Image Colors Help
For Help, click Help Topics on the Help Menu.

Figure 14-32

Capturing Screen Images

4

Click the Start button on the taskbar, point to Programs on the Start menu, and point to Accessories on the Programs submenu. Press the PRINT SCREEN key on your keyboard. Click WordPad on the Accessories submenu. In WordPad, type your name followed by `Below is a Windows Screen Shot:` and then press the ENTER key twice. Click Edit on the menu bar and then click Paste. Use the scroll bar to scroll through the document. Click the Print button on the toolbar to print the file. Close WordPad. Do not save the file unless your instructor tells you to do so.

Web Work

Web Instructions: To display this page from the Web, start your browser and enter the URL scsite.com/dc2002/ch14/web.htm. To view At The Movies in exercise 1, RealPlayer must be installed on your computer (download by clicking here).

1

BizTech & Productivity

To view the BizTech & Productivity movie, click the button to the left or click the Play button to the right. Watch the movie, and then complete the exercise by answering the question below. For decades, business productivity climbed at a comfortable, steady rate. Then, in the 1990s, expanding implementation of computer applications, the proliferation of personal computers, and the advent of the Internet caused the percentage of productivity gain to more than double by the year 2000. What new technologies or Internet-like medium do you foresee keeping these high-gain rates going?

2

Customizing Your E-Mail Program

Many e-mail programs can be customized. To customize your e-mail program, click the button to the left to display your e-mail service. Enter your Login Name and Password. When the In-Box screen displays, click Options. On the Options sheet, click the Filters link in the Mail Handling column. Follow the directions on the Options: Filters sheet to block senders of mail you do not want to receive and direct incoming messages to specific folders. Click the OK button. On the Options sheet, click the Signature link in the Additional Options column. Follow the directions on the Options: Signature sheet to create a signature that will be added to outgoing messages. Click the OK button. Read any new mail. When you have read all of your messages, click Log Out to quit your e-mail program.

3

System Development Life Cycle (SDLC)

People deal with problems in a variety of ways. An anthropologist studying workers in Silicon Valley tells the story of an engineer who kept a list of dilemmas with possible answers. When the list got too long, the engineer's solution simply was to combine the problems into a shorter list. The core of the SDLC is based on a standard, more effective approach to problem solving. To learn about different approaches, click the button to the left and complete this exercise.

4

Computer-Aided Software Engineering (CASE)

A difficult task in the design phase is to organize all of the information needed by an organization and to document the flow of data within the organization. One estimate indicates that the amount of material amassed in this phase is greater than the quantity of information an average person in the seventeenth century would acquire in a lifetime. To learn more about one of the many CASE products available for managing information and tracking data, click the button to the left and complete this exercise.

5

In the News

When teams from around the world gathered in France for the World Cup soccer championship, more than 60 groups of researchers met at a Paris café for another event — the annual Robot Football World Cup. Click the button to the left and read a news article about an innovative development or use of a computer information system. Who developed or used the system? In what way is the development or use of the system original?